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ABSTRACT

This document consists of one volume year (four quarterly issues) of the journal "Telecommunications in Education News." Each issue contains a call for articles and three regular columns: "Editor's Message" (Trevor Owen), "President's Message" (Chuck Lynd), and "NewsBits" (Gleason Sackman, Ed.). Article topics include: online activity plan contest winners; teaching Medieval Icelandic literature and mythology using the World Wide Web; using the World Wide Web as an instructional tool; women on the World Wide Web; implementation of a World Wide Web course on the use of Internet applications in the classroom; motivating learning using the World Wide Web and HTML; graduate student research--"Music, Technology, and Textual Presence"; a teleconferencing project in the English classroom; wireless networks in the educational environment; impact of World Wide Web access on the instructional process; a keynote speaker's view of Tel-Ed '96; online teacher training; role of technology in helping educators network, research, and complete their doctorates; helping students plan and design World Wide Web sites; and book reviews. Author and subject indexes to "T.I.E. News" volumes 1-7 are provided in issue number 3. (SWC)

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T.I.E.

Telecommunications in Education News

Volume 8 Number 1 November 1996

IN THIS ISSUE:

- **1996 ONLINE ACTIVITY PLAN CONTEST WINNERS**
- **LEARNING AND THE WEB**

T.I.E. News Volume 8 Number 1

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Editor's Message

Trevor Owen

Learning and the Web

Clearly, the World Wide Web has caught fire, bringing many more people online. But how do we actually use it, or imagine its use, in the educational community? Is the Web really just a step backward, trading away the gains we have made in creating interactive learning communities by promoting access to, and publication of materials without necessary checks on quality? Is it a valuable learning enterprise, engaging students and teachers in the construction of knowledge through HTML? This call seeks articles from people who have considered their use of the Web, with a particular focus on the construction of Web pages and the impact of this activity on learning.

I am very pleased, indeed, to offer our theme issue on Learning and the Web. There was an excellent response to our call for articles on this topic, which is reproduced at the beginning of this column, and we have a range of topics and experiences that will serve the interests of online educators at all levels of experience.

Janice Flake, from Florida State University in Tallahassee, offers an article that is likely to be especially useful to those who are just starting out. She provides a framework for understanding issues related to using the World Wide Web as an instructional tool, and presents her work on a "virtual learning center," which considers how lifelong learning is facilitated by new capabilities and skills learned online.

Marcos Silva, a lecturer with the Distance Education Program in the Faculty of Education at McGill University in Montréal, Québec describes the design and implementation of an Internet resources course, which locates "the knowledge of basic Internet applications and resources" and the new learning environments that sustain them.

Steve Skultety, a teacher at Charleswood Junior High School in Winnipeg, Manitoba tells us how learning with, and not about, technology helps students to become better learners. He describes the "Canadian Home Page Olympics," a project he supervised for Canada's SchoolNet, which involved students in the construction of knowledge through the construction of Web sites.

Harpa Hreinsdottir, who writes from Fjoelbrautaskoli Vesturlands a Akranesi, Akranes, Iceland, tells us about "new ways to teach old books," and describes how she uses the Web to advance learning about medieval Icelandic literature and mythology. As she notes in her article

> the students felt that we were making something important and that we were all working as one team, and that we were all doing our best, instead of the usual "teacher–student hierarchy."

Winifred Wood, director of The Writing Program, Wellesley College near Boston, writes about how the introduction of the Web created new ways of learning in her "Strong Women in Film" course—both for her students and herself. Her experiences, and the experiences of her students, which are offered as a narrative in her article, make compelling reading for the online educator who is seeking to make sense out of using the Web in an existing context.

Regulars, Contest Results, and New Calls

Our regular features are here in their usual spots as well, along with the results of the 1996 Telecomputing Activity Plan Contest. Our calls for articles, including "In The Classroom," which will appear in the next issue of *T.I.E.*, and our ongoing "Graduate Student Research" series are described on the inside back cover.

Welcome Tel•Ed Participants

I am also happy to report that this issue of *T.I.E. News* will be distributed to delegates at Tel•Ed this year. I hope you enjoy the work represented here, and I invite you to participate in future issues both as subscribers and as participants.

Presenters are welcome to submit their conference papers, updates to their presentations, or both for publication as well.

Finally, let me add *takk fyrir* to Harpa Hreinsdottir's students for supplying our cover art for this issue.

Cheers
Trevor

President's Message

Chuck Lynd

Students and teachers both are "learning on the Web," as this issue aptly demonstrates. In fact, each new issue of *T.I.E. News* brings with it even more stories and articles that underscore the increasing importance of the Web as a place where learning occurs. The decentralized, multimedia nature of the Web, with its hypertext links to servers around the world, make it possible for learning to occur virtually (pun intended :-)), anywhere, anytime.

This new global medium is potentially so powerful that many futurists and pundits are predicting that its impact on society will rival or surpass the invention of the printing press. If even a small fraction of the hype surrounding the Internet in general and the Web in particular is true, then we need to pause and reflect upon the impact it is having and will have on the classroom.

As Jamie McKenzie noted recently in his thoughtful "From Now On" column (Vol. 6, No. 1, *http://www.pacificrim.net/~mckenzie*), the excitement surrounding the Internet is creating a bandwagon effect as educators around the world make plans to get connected. Too often, observes McKenzie, districts install the wiring in their schools before they ask the critical curriculum and learning questions. Are teachers managing their classroom in a traditional, "sage-on-the-stage" approach that relies on a one-way distribution of distilled knowledge from a textbook to the students? Or have teachers moved to a "guide-on-the-side" role, providing support and facilitating a more open-ended approach to student learning?

McKenzie puts it bluntly:

> Unless classrooms are inquiry based, project based or problem based, it may be a waste of money to connect with the Internet. Unless questions and research are central to life in the classroom, the Internet may serve little purpose worth the millions of dollars of infrastructure required to establish a "robust" connection to the Net.

This distinction is very helpful in sorting out futuristic scenarios projected by writers and education critics like Lew Perelman, whose book *School's OUT: Hyperlearning, the New Technology, and the End of Education* (1992), predicts the imminent demise of classroom-based learning. These critics ask probing and disturbing questions that leave today's classroom out of the picture:

- Why pay $400 billion dollars annually for an infrastructure of bricks and mortar, stocked with certified teachers, when soon everyone will be able to afford a computer that can surf for digital resource information and communicate with experts who offer answers on every imaginable topic?
- Why not invest in the Information Superhighway, privatize schools, and return the savings of public money to entrepreneurs who will create a renaissance of new high-technology business opportunities?

Certainly the growth of home schooling is one indicator that the classroom can be reproduced in the home, and the steady growth of the corporate training industry shows that classrooms can be reproduced outside colleges and universities. Distance learning programs are increasingly accepted by a highly mobile population, and that too is a trend that may chip away at the dominance of classroom-based learning. As local and state education agencies invest in the information infrastructure of networks, including the production of content to be carried by those networks, there is likely to be competition for funding that has traditionally gone to buildings and teacher salaries.

On the political front, we see insistent calls for greater school choice supported by a variety of school finance reforms. Some of these proposals are designed to use tax money not only for private school tuition but also for learning vouchers that could be redeemed by parents and students for individualized tutoring services and distance learning programs, as well as to access units of study that reside on Internet servers around the world.

These trends suggest an evolution of hyperlearning that is consistent with Perelman's vision, but the adventurous classroom-based projects and innovative activities that fill the pages of *T.I.E. News* paint a very different picture. Here we see the work of pioneering teachers who have made the transition to a new form of classroom-based learning that is highly compatible

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with Internet tools and communications on the World Wide Web. Their model projects are setting new standards and breathing new life into the "bricks and mortar" of today's classroom.

Adding to the sense of vitality in classrooms that have made the transition to inquiry-based learning is a new emphasis and appreciation of the social and cultural interactions that occur when students work cooperatively in teams and when teachers collaborate with each other and with adults in communities outside the school walls. Project- and problem-based learning encourages students to work with each other while learning to access resources and communicate with people in their own communities and other regions of the world.

ISTE and SIG/Tel will continue to encourage teachers who are bringing creativity and energy to classrooms through Internet- and Web-based learning projects. Our 1996 contest included 20 award winning projects selected by a panel of experts. Look for even more Web-based learning projects in the pages of *T.I.E. News*, and if you are a newcomer to SIG/Tel, consider this your invitation to participate in the 1997 contest. Details can always be found online at http://isteonline.uoregon.edu.

See you online if not face-to-face at Tel•Ed/Multimedia or NECC '97!

***Chuck Lynd**, SIG/Tel President, Center for Special Needs Populations, Ackerman Place, Suite 400, 700 Ackerman Road, Columbus, OH 43202; 76703.674@compuserve.com*

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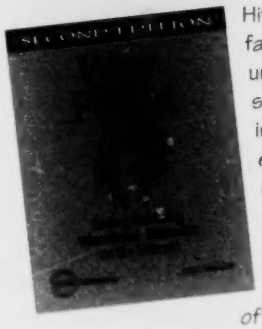
A GREAT Book from ISTE

CyberFrontier



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Extending the common-sense approach of her "Mining the Internet" column in *Learning & Leading With Technology*, Judi Harris uses her experience with students and educators along with skillful, humorous analogies to explore the boundaries of the cyberfrontier.

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The 1996 Online Activity Plan Contest Winners and Honorable Mentions

by Kathy Kothmann

Editor's Note: Many thanks to Kathy for compiling this report on the 1996 contest winners and honorable mentions. The descriptions that follow are summaries that provide the basic information about each project. As Kathy noted when sending this report along, the projects were judged on the entire template submitted, not just the summary that appears here. Our thanks to all the online educators who submitted their projects, and congratulations to those selected by the contest panel.

Winners

Learning from History & the Internet: The Mock Trial of George Armstrong Custer

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This is a unit of study in CLASS II (Cultural Literacy through Art and Social Studies), an interdisciplinary, team-taught humanities class. Students were assigned specific areas to research about Custer, his troops, government policies, the Native Americans involved in the Battle of the Little Bighorn, and other current events of the time period. They used traditional library and Internet resources. After conducting the research, defense and prosecution teams were formed and a mock trial was conducted. A daily student "newspaper" was created to share the results of the trial with the rest of the school. (Once the capability is there, a CLASS home page on the Internet will feature a link to examples and results from this trial).

SWAP (Scrimshaw Whale Art Projects)

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While studying oceanography, fourth-grade students discovered the word "scrimshaw" in a crossword puzzle. To acquaint themselves with this form of carving and engraving on whale bone or whale ivory, which was a handicraft practiced by sailors during long voyages, they contacted a local collector. Careful scrutiny of the objects revealed much about the American whalers' history and philosophies. Afraid that this rare art form may never be viewed by others because of the decline of the whaling industry and the embargo against killing whales worldwide, students would like to contribute to a "scrimshaw gallery" through a Web site.

Virtual Odyssey

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Imagine yourself on a safari just outside of Kenya. Picture yourself racing to the airport in Bangkok, trying to meet your plane headed back to the states after 20 days abroad. Visualize yourself and your friends checking in to the youth hostel on Crete, resting up for your archeological dig in the morning. The Virtual Odyssey project will take you there. Through the Virtual Odyssey, students will get to experience international travel without ever leaving their own classrooms. Each team personalizes the adventure so that each experience is unique. In the process, students are relating to the journeys of Odysseus in Homer's *Odyssey*. Students blindly choose

arrival locations around the world, avoiding the United States and Europe (places with which most students are familiar). Their odyssey takes place over a virtual 20 days, as they budget and plan to visit a certain number of cities and famous sites. During their planning, students complete activities from customs checks to souvenir shopping. Because these assignments are open ended, students are encouraged to think creatively and critically to produce quality work. After the work was completed, one student said, "This is a fun project and very mind challenging. I wish all my classes did this stuff."

Allons en France!

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Partners will develop an itinerary, complete with travel arrangements and a packing list for a nine-day trip to France. In addition, each person will need to keep a detailed journal of their trip (in English) with daily reactions to what they did, saw, and learned (in French). Using an Internet Postcard Site, each student will send a postcard to their French teacher, who wasn't able to accompany them on their journey. The postcard must also be in French and the picture on the card should be an image of a place they visited or a piece of artwork that they saw in a museum. Finally, partners will need to show the French class a slide show of some photos that were taken during the trip. Partners should each take five pictures, put them into a slide show, and be prepared to tell the class about the photos.

Koala's Adventures

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What would be a great way to learn about our 50 states? That was the question I was faced with. Who better to answer it that my class of second-grade students. After some discussion and brainstorming, the children decided that taking a field trip would be the best way to gather information and it would be fun. Once we looked at the approximate cost and distance we would have to travel, the class decided on a better way. We would send our class mascot, a teddy bear named Koala (because we are a "Koalaty Class") on a virtual field trip all over the United States. We started simply by writing together a short letter explaining our project. Then, using the Macintosh LCII in our classroom, we e-mailed several of our friends, or keypals, from different places. We asked them to pretend that Koala was visiting with them for a couple days and to teach him interesting facts about where they live and work. Our online friends then e-mail the class back a letter to include in Koala's "journal" of adventures. In their letter, we ask that they include interesting and factual information about their state or town, or just their school and workplace. Once they have added their state to Koala's Adventures, we ask that they send him on to a friend they may have living somewhere else so that the cycle continues. The response has been great. Most of all, the children are learning wonderful information about so many places. This information is meaningful and, consequently, easily remembered.

Designing Virtual Practicums for Preservice Teachers

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Pairs and trios of student teachers in their fourth year of education at Massey University, New Zealand, were connected to groups of volunteer students from either the Nechako Electronic Busing Program™ (a unique

program that offers support to parents who have elected to school their children at home) or Sinkut View Elementary School, Vanderhoof, British Columbia, for a short online practicum project. Student-teacher pairs developed a series of 4-6 related online activities that would enable the volunteer students to accomplish specific learning goals. All activities were delivered and supported at a distance. Twenty-two student teachers are involved (10 groups) with 52 students between the ages of 8-15 (34 Sinkut View Elementary students in Grades 4-6 and 18 Electronic Busing Program students in Grades 3-10). Topics were selected from within the framework of BC curriculum by the student teachers and supported by the use of Internet resources.

The Media Matter

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The choice of "double entendre" for project title was deliberate; not only did we believe "the media matter," but we were also inclined to think "something's the matter" with media. Marshall McLuhan's belief that "the medium is the message" served as our point of departure, inviting students on three continents to compare and contrast local, national, and international news media. In essence, we used the World Wide Web as a "laboratory," meeting there to dissect newspapers, magazines, radio, television, and the Internet. Students were encouraged to "read" and "analyze" a designated news medium, examining the ways in which that medium "shapes" a news story. Biweekly exchanges of "Media Reports," through a project listserv maintained in Kuala Lumpur, allowed students in Asia, Africa, and North America to discuss fundamental concerns such as censorship, advertising and "freedom of the press." In follow-up e-mail exchanges, students critiqued the signs, symbols, and methods of their medium, attempting to measure the veracity—and bias—of particular reports and reporters. Ultimately, they confronted the universal challenge for all media "readers": how to distinguish fact from fiction, data from propaganda, and "misinformation" from truth.

Note: Buddy Burniske has just moved to Austin, TX. His new address is 4305 Duval Street, Apartment 306, Austin, Texas 78751; ph. 512/453-4541; burniske@babbage.cwrl.utexas.edu.

Houston ... We Have a Problem

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Students are engaged in a problem-solving scenario in which one school functions as Houston Mission Control and the other school simulates operations performed in an Apollo capsule. Partner schools compete with other partner schools by racing against each other; time and safely returning "home" are the determining variables in this race. A maze, exactly duplicated at each school site, allows Mission Control to help school astronauts "work the problem" while astronauts at the

school site use specific tools to perform each operation. Each tool may be used only once in the operation because a contamination factor is introduced into the problem. Using these tools, astronauts manipulate a nuclear fuel cell (raw egg) through a space capsule (an intricate maze). Successful manipulation of the cell will enable the partner schools to return safely "home." The team that returns home in the least amount of time is the top competitor. All communication between Mission Control and the Apollo capsule is confined to messages sent through computers and astronauts must agree with Houston's suggested sequence of instructions before each step in the process is completed. All telecommunications involve the use of NASA-like acronyms.

CU-SeeMe Cinco de Mayo

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Each year the Danville Area Middle School Spanish teacher plans special activities to coincide with Cinco de Mayo. Since last year, it has been this teacher's goal to use telecommunications to enhance both the written and spoken Spanish skills of her eighth-grade students as a part of this year's celebration. After establishing a partnership with a school with similar goals and discussing curriculum plans and technical possibilities, e-mail and CU-SeeMe were established as the telecommunications mediums to be employed in addition to traditional mail services. The Spanish teachers at each school prepared the presentations during class and activity periods, and the CU-SeeMe Cinco de Mayo presentation serving as the culminating activity.

Cyberspace State Reports

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Traditionally, the first big research paper is done in the fifth grade—the dreaded state report. Although the product tends to be boring, many teachers hold on to this icon because of the research skills involved. Cyberspace State Reports still utilize quality research skills, but add the dimension of the Internet, which vastly improves the motivation as well as the product. Letter writing skills, using e-mail, are also enhanced.

Space Masons

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Space Masons is an astronomy education outreach project of the Ohio Valley Vocational School's 1997 Masonry class, and was created as a remembrance of the space shuttle Challenger flight's 10th anniversary. Its mission is to increase public awareness and appreciation of astronomy and space exploration, to develop our science knowledge and skills, and to communicate with individuals from around our small blue planet who share our interest in the night sky. Space Masons currently publishes weekly news columns on astronomy in the local newspapers, broadcasts public service announcements on the radio on local events in the night sky, offers free public astronomy seminars and star parties to star gazers of all ages, and directs a global micrometeorite research project using the Internet.

Tracking A Cold Front—Here it Comes, There it GOES!

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Using telecommunications, ground observations, and weather satellite imagery students from two elementary schools on the Gulf Coast in Florida tracked a cold front. Providing online support, Dr. David McGinnis, a research associate at The Cooperative Institute for Research in Environmental Sciences, Boulder, Colorado, Dr. Paul Ruscher, of Florida State University's FLORIDA EXPLORES! program, and Dr. David A. Thomas, of Montana State's NETWORK MONTANA PROJECT, answered questions students asked while setting up this project.

Honorable Mentions

BABEL: Classroom Crosscultural Exploration Dialogues

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The tower of Babel, whether fable or history, indicates just how ancient is the understanding of the role of communication and its close relationship with the culture, human society, and technology. Communication continues to play a pivotal role in society. Life is enriched or impoverished by our relationships, and our relationships are based upon communication. Today, the Internet, perhaps more than any other communication medium, is stimulating never-before-seen levels of technological progress. Multicultural education within a pluralistic society should affirm and assist students in understanding their home community cultures and a world without borders. When one communicates, one becomes aware of otherness. Communicating with students around the world (20 teams) using the Internet classroom and multicultural debates, Texas Tech students learned about themselves, their own value orientations, prejudices, and racism. They used e-mail and online conferences.

NewsWave

Author: *Dalia Naujokaitis*
Other Contributing Authors: *This project has been repeated three times since the fall of 1995. All the enthusiastic classes participating in the project are the authors, for NewsWave could not exist without them.*

- *Fall Issue: UN at 50 years (26 classes across Canada)*
- *Mars Above and Beyond: Marsville (30 classes from the Ottawa region)*
- *Greening the 90s: in progress (23 classes worldwide)*

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NewsWave is a theme-based electronic and print news magazine created, illustrated, and published by students for students. In this project students around the world write news articles and upload them to the NewsWave listserv (mounted on Canada's SchoolNet) to create their own electronic "wire service." Each participating class then chooses which materials to download in order to publish its own news magazine or newsletter. Hard copies of publications are shared among participants by "snail mail." The Grade 6 students at St. Elizabeth School use the uploaded articles to create, manage, and publish NewsWave electronically on the World Wide Web for the whole world to see. Students participating in this multidimensional project not only become researchers and analysts, but also writers and publishers. Through the use of technology, they gather, analyze, process, and communicate information dealing with contemporary issues in the real world. Through their own Youthspeak forum (on the listserv and home page)students engage in online discussions based on the theme that is being investigated.

Folktales Around The World

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This was an intergenerational project that involved intermediate ESL students from an adult school and native-English speaking pupils from a gifted program in a nearby middle school. The project involved a combination of e-mail exchange and face-to-face visits. With some creativity, however, similar projects could be organized without the face-to-face meetings (for example, only by e-mail, or by e-mail and mailed audio cassettes).

Water Quality and Communication

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This series of lessons were student initiated. The SIS teaching strategy was implemented. Students began by collecting and testing water samples from tributaries to the Tennessee River and conveying their results to other students in the Tennessee Valley Project (a statewide telecommunication project) using e-mail. They originally planned to compare findings at various locations (before Watts Bar Dam, etc.), but students then became interested in water across the United States and began an all-out campaign using technology to see if they could collect samples from every state using technology.

Mighty M&M Math

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This project teaches averages, fractions, and percentages in a motivating and mouth-watering way using M&M candies. It answers the following questions.

- What is the percentage of each color of M&Ms in a bag?
- How do the percentages compare to those used by the manufacturer?
- Are the percentages similar worldwide?

Spectacle Island and the Big Dig

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In this project, students created Web pages about the history and revegetation of Spectacle Island as part of the multibillion dollar transportation project known in Massachusetts as the Big Dig. The Big Dig is the largest transportation project in the history of the United States, and Spectacle Island is the future home of the interpretive center for the project. Students used the Internet to research topics related to Spectacle Island and the Big Dig, published this information online in the form of Web pages, and e-mailed various environmental and political agencies about their environmental concerns. This project promotes team and community cooperation, scientific and technological literacy, writing across the curriculum, creative writing, historical accuracy in writing, student-to-student cooperation, computer literacy, research and communication through e-mail, use of the Web as a research tool, designing and implementing HTML Web pages, the use of graphics and visuals within these Web pages to support other methods of communication, and the of learning presentation and research skills.

Please take the time to visit our Web site, which is best viewed with Netscape, at http://kalypso.cybercom.net/~dhe/explorerteam.html

Flying the Internet

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Flying the Internet is a science education program designed to stimulate and prepare students for productive careers in science, engineering, and technology. This goal will be accomplished by providing students with scientist and aviation mentors who will guide them in a real-world aviation challenge that combines "hands-on" use of the Internet, long-distance teamwork building model airplanes, and actual exposure to the science of flight.

The Nadine Gordimer Internet Project

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Imagine students reading a Nobel Prize winner's short stories, analyzing them with classmates and then corresponding with people in South Africa to ask questions prompted by the stories. This project introduced novices to e-mail; enriched their study of Nadine Gordimer's fiction; and helped create a greater context for the study of South African history, politics, and literature. The following quote, excerpted from the "Introduction" to Gordimer's *Selected Stories*, served as our starting point:

> What I am saying is that I see that many of these stories could not have been written later or earlier than they were. If I could have juggled them around in the contents list of this collection without that being evident, they would have been false in some way important to me as a writer. What I am also saying, then, is that in a certain sense a writer is "selected" by his subject—his subject being the consciousness of his own era.

Students at the International School of Kuala Lumpur explored this idea by studying Gordimer's stories from the 1950s, 1960s, and 1970s. Following class discussion, they drafted "story element" reports in small groups, along with a "Letter to South Africa" and questions of a critical nature, for distribution on the "schoolza" listserv in South Africa. This resulted not only in correspondence with black township students in Port Alfred, Afrikaner students in Pretoria and Queenstown, "coloured" students in Durban, and British descendants in Grahamstown, but also a letter from Nadine Gordimer herself, in response to questions initially transmitted through the Internet.

Note: Buddy Burniske has just moved to Austin, TX. His new address is 4305 Duval Street, Apartment 306, Austin, Texas 78751; ph. 512/453-4541; burniske@babbage.cwrl.utexas.edu.

New Ways to Teach Old Books—Medieval Icelandic Literature and Mythology

by Harpa Hreinsdottir

Last year I taught Icelandic in a comprehensive school in Iceland. When I first saw the World Wide Web, in the autumn of 1994, I was fascinated by its possibilities, not only for gathering information, but also for presenting it. I saw the Web as a tool to "open the schools," that is, to show some examples of what we do in school. I decided to try this idea out in my teaching of Icelandic Sagas and Norse Mythology (i.e., literature written in the 13th century).

The goals I wanted to achieve by teaching this way included the following:

- Help students become ambitious, and motivate them to work harder.
- Help students become familiar with new technology.
- Let the students evaluate each others' texts.

During autumn term, 1995, I had 114 students in five groups making Web pages about Laxdaela Saga and Snorri Sturluson's Prose Edda, which is about Norse Mythology. In the spring term, 30 students, in two groups, made Web pages about Egill's Saga and Snorri Sturluson.

Because we had only one computer and modem in the classroom, I couldn't teach all the students the HTML language to create Web pages; each of them did, however, have the opportunity to browse the Web. When I wanted to show the whole class the results of their work I connected the computer to a television set in the classroom.

Each time the students started working on a Web page there was a competition, that is, the students wrote the texts together in several small groups and then one small group evaluated the texts and chose the best one. We tried to put new people in the evaluation group every time a new task was assigned. Sometimes the class chose somebody to draw a picture, but other times there was a competition like in their text-based work.

Each time a job was assigned the students could choose between tasks. Some of them wanted to take care of pictures (draw, find photographs, simplify maps, etc.), some wanted to write text, some wanted to translate the texts into English, and some comprised the evaluation group. One student even spent his Christmas holiday translating the mythology part of the Web into Danish!

What kind of tasks there were and how they were done depended on the subject. When my students made pages about Snorri Sturluson, they had to look into a lot of written sources because we didn't have a book that was only about Snorri. They also watched videos and even phoned the vicar at Reyholt, where Snorri lived, to get information! But when doing pages about Egill's Saga, the main source was the saga itself. Egill's Saga takes place in the neighbourhood, so some of the students knew the surroundings pretty well and were able to use that knowledge.

The main emphasis in the sagas was on the characters. The students wrote short papers on the main characters, the women, the heroes, and so on. The story was retold in "news" format; that is, we made two "newspapers" with news from the ninth and tenth centuries. There were also other kinds of newspapers, only for fun, where the news consisted of gossip, which the students made up, of course.

When working on Laxdaela, the students wrote letters from and to the main characters and tried to put themselves in each character's place. When working on Egill's Saga, the students wrote texts about Egill in modern times. But most of the time they wrote about things happening in the sagas themselves. Maps of the places where the sagas took place were drawn, as well as several pictures of the characters and events. The sidebar on the next page shows some examples of the students' work.

I didn't grade the students' work, although I did give them points for working. Everybody got the same points regardless of how well the work was done. It turned

out that everybody wanted his or her work to appear on the Web, and, because the class did their best all the time, grading from the teacher wasn't necessary at all. The students were also very much aware of their audience. They knew that people outside the school read their Web pages and they wanted to show their best, so the evaluation team took its job very seriously. In this model, the teacher doesn't have to read all the papers, just the chosen one. Making these Web pages took the place of short essays and other compositions. The points for the work on these Web pages constituted 10%–20% of the final marks for the modules. The students took the same exams as usual and wrote long essays as usual. And, the teaching was mostly the same as usual. I never intended to "teach the Web"; instead, I to use the Web as a tool to teach literature and to encourage my students to write.

Composing Web pages was, therefore, just a new way of doing old tasks. But it seemed that the students enjoyed this new way of working very much. They frequently said so, and this was also obvious from their answers to a questionnaire at the end of the autumn term. A big factor in the students' enjoyment was all the response and attention they got to their work. We took part in the project "24hrs in Cyberspace"; had a two-page review in the Sunday *Morgunbladid*, Iceland's biggest newspaper; and a short TV program was made about our work. We got a lot of letters and, using e-mail, got acquainted with a member of Asatruarfelagid (The Icelandic Pagan Society) and joined them at their "Vorblot" (Rites of Spring).

The students felt that we were all working as one team to make something important, and that we were all doing our best, instead of working in the usual "teacher–student hierarchy." I've never enjoyed teaching as much as last term! But—I have to warn you—this is a tremendous amount of work for the teacher! The teacher has to know the project from A to Z; organize the whole Web component before any work starts; and keep control all the time but, at the same time, be able to "disappear" and melt into the group of students. The teacher has to make sure that all the students are well oriented and aware of what is going on all the time. The teacher is like the spider in the middle of the Web, holding all the threads in his or her hands and working as industriously as a spider has to.

Despite all this work I'm going to use the Web in teaching next year. I start teaching in a small old-fashioned high school in the south of Iceland. There I'm going to integrate the Web into the teaching of Njal's Saga and other medieval Icelandic literature.

***Harpa Hreinsdottir**, Fjoelbrautaskoli Vesturlands a Akranesi, Akranes, Iceland; harpa@ismennt.is; http://rvik.ismennt.is/~harpa/forn*

Student-Created Art for the Mythology and Sagas Home Page

These three graphics are samples from the Web page Harpa Hreinsdottir and her students created. To read the stories and see more art, visit the Web site at http://rvik.ismennt.is/~harpa/forn/engfvest.html.

Egill: Aja vetra gamall i veislu hja Yngvari (blindfullur). [Trans. Egill, three years old, at a party at Yngvari's (his grandfather) passed (dead drunk).]—From Egill's Saga

Snorri Sturluson and his the women in his life. Snorri wrote Snorra-Edda and, possibly, Egill's Saga.

Odinn is the supreme god and father of all—From Snorra-Edda

Using the World Wide Web as an Instructional Tool

by Janice L. Flake

This article addresses a number of issues related to using the World Wide Web as an instructional tool. These issues include: Internet skills, paradigm shifts, and a sample virtual learning center. The Web holds much potential and some areas of concern.

Internet Skills

During the past year I worked with our local school district to work with a study group charged to develop learning outcomes targeted for the fifth graders for using the Internet. Internet skills for fifth graders in Leon County, Florida, include skills in the following four key areas:

- Navigating: Moving around the Web, including finding specific locations and taking advantage of many of the features of a Web browser.
- Information Gathering: Effectively making use of search engines to find and retrieve information, using keywords, and refining searches.
- Communicating: Making use of various communications capabilities, including sending and receiving e-mail and using chat rooms, listservs, and news groups.
- Publishing: Including, among other things, developing and posting a home page and finding a way to post the home page on a server so that others can access it, as well as maintaining the home page so those ideas, links, etc., are kept up-to-date).

How many of us were expected to learn these types of things in fifth grade?

Just because these skills were identified, that does not mean that they are intended to be minimal skills. They are skills that are to help provide guidance to teachers for directions to help students develop in these areas. A number of our local schools have or are getting Internet capabilities at this point. Navigating and gathering information are particularly important for these students. In many cases, students want to develop home pages, and I feel that they should have the opportunity.

I think younger children can gain a lot by developing HyperStudio stacks that can be used in real time on a network as described in "Real Time, HyperStudio on the Internet!" (*http://www.anoka.k12.mn.us/HyperStudio/realtime.html*). Through the years I have observed a number of students who have become very active in the creation process using computers. As those children have grown into adults, those early technology experiences have been very important for helping these students grow into active technology users.

Brauch, Gerhold, and Patt (1996) conducted a survey about how students were using the Web. Responses from about 26 states in the United States, mainly from teachers, indicated that the ways in which students used the Web were, in the following order (starting with the most frequently used): student research, free time, reward, home pages, collaboration, and other. This study identified uses consistent with the ways that our local school district, Leon County, has defined Internet skills. The fact that students are using their free time on the Web and find it rewarding is very positive. The ultimate goal for educators is to help build intrinsically motivating environments with which students will choose to spend time rather than many of the less constructive ways they could be spending their time. The students will learn from their own interests and activities.

Whether students learn and use HTML, HyperStudio, or some other tool, each of these tools should provide a vehicle for students to share their thoughts with the world. Such vehicles, or "sites" on the Web, may include the students' own creative work—which might be text, graphics, photos, video and audio clips, and programs—or links to their favorite sites.

As students build links, their activities should move beyond a random collection of sites to more focused research on a specific topic; students will pursue their chosen topics and search for related sites to develop

those topics. I encourage students to include point-and-click versions of their e-mail addresses, so that viewers can communicate with them if they want. (I also encourage students not to include their home addresses or telephone numbers for safety purposes.)

I try to keep the focus on communication about ideas. Students can think of their home pages as their own personal broadcast stations, where they can share whatever ideas they want. The broadcast station concept could provide motivation for students to do quality work in each of these areas. The broadcast station also becomes a vehicle for students to be active participants in a global learning environment.

Construction of a home page can be a recursive process, involving revisions and updating, rather than a linear process where ideas are developed and published once and for all—right or wrong. Through a recursive process, the student makes improvements, revisions, additions, and so on. Students can learn that making revisions may be more important than a first time right or wrong.

The Web is a very real part of today's world, and I have every reason to believe that it will continue to grow. Helping students become comfortable and functional with the Web will help them become active lifelong users. Remember, as is pointed out in *Reinventing Schools*, today's children have grown out of the Nintendo age and do not know a world without computers.

Paradigm Shifts—Including the Shift Toward Lifelong Learning

Traditional school settings have often been very "left hemisphere" and oriented linearly, with the teacher at the forefront of control. As students grow up in the Nintendo era, having access to home computers, the Web, and many other capabilities, many organizations are making major recommendations to move to a very different model for instruction.

For example, *Pathways to School Improvement* and *Reinventing Schools* suggest major paradigm shifts. Perhaps foremost in the shifts, which the Web makes feasible, is the shift from learning specific content to lifelong learning. Too often schools spend time teaching and stressing skills that become outdated. At the same time, the students do not necessarily get the skills to get more skills and to take charge of their own education.

Also included in major paradigm shifts is the shift from teaching to learning. One extreme teaching–learning model is for the teacher to maintain total control. All students do exactly what the teacher decides. The problem with this model is that it makes it almost impossible for students to learn to take charge of their own education.

The other extreme is allowing students to have control of their education. There are pros and cons for allowing students to have more control over their education. Some of the pros include the ability that students acquire to pursue areas that are more meaningful to them at a given time, which develops skills for lifelong learning. There are also some cons. Some people, for example, are skeptical because we may not be sure that they are learning the basics, or even that we will be able to agree on what "the basics" are or whether they are changing.

Another paradigm shift occurring is the shift away from an emphasis on testing to an emphasis on portfolio assessment. One could think of the Web as a means for providing each person a forum for expressing views, sharing ideas, and connecting with others with similar interests. When the students have to pull ideas together and express their views coherently, they develop communication skills. Current constructivist views suggest that learning should evolve out of the learner as opposed to being poured into the learner. The home page can provide such a forum for the learner to share what he or she is pursuing. I mentioned earlier that I encourage students to include a point-and-click e-mail address so that viewers can send messages in order to provide an interactive forum. Such messages may support, expand, or refute ideas expressed on the home page.

Another paradigm shift to consider is the concept of classrooms without walls. Students no longer need to be sitting in their rows and columns facing the teacher, who is dispersing information. Students may be working on a variety of projects and using the Web to gather information from the world; they may not even need to be at school.

For several years now there has been a movement toward home schooling. I have viewed this movement with some skepticism, not because I disagree with home schooling so much as because I have concerns about the things that I believe schools provide. I believe that

the school serves the function of taking responsibility for the students, where there are adults accountable for the students. I also believe that the school serves as a social institution, with students exchanging ideas with both adults and peers. Because of the Web, home schooling is more possible because it is feasible to have access to a large set of resources, and it is feasible to build a community for social constructions online. The issue of making sure that there is an adult responsible for the student's learning is still the home responsibility—for those who are willing to take it on. At any rate, school no longer needs to be limited to the four walls of a classroom.

As we look at the whole communications revolution, we might think about the Web as being similar to television, moving from simply showing movies and sitcoms (involving transmitting information out) to increased interest in talk shows and town meetings (involving a more interactive forum). Another analogy is the instant dissemination of information. For example, when a major disaster happens, people no longer need to wait for the next day's newspaper to disseminate the information—news services interrupt television programs. This corresponds with the immediateness of the Web. For example, e-mail can be sent and received virtually instantaneously and news services on the Web can be immediately updated.

Another major paradigm shift is the way that we educate teachers. I have proposed (Flake, in review) a program for building an emphasis on the Web into an elementary education program.

Sample Virtual Learning Center

I have begun developing a "virtual learning center." In this virtual learning center, I have built several categories that help to build a conceptual approach to how this technology can be used in learning. Interested readers will find it at http://mailer.fsu.edu/~jflake/.

This virtual learning center includes the following sections:

- Sample Learning Environments. This section suggests a number of online sites, including museums, institutions, news services for current events, various sites particularly for children, and samples of thematic units.
- School Improvement. This section contains links to sources related to suggestions for school improvement such as: *Pathways to School Improvement* and *Reinventing Schools* (listed in the references), as well as a number of related topics.
- Power Learning. Power Learning is the centerpiece of this center and includes a number of links connecting sites related to such areas as: problem solving, imagery, reflective thinking, and critical thinking.
- Vision. This section suggests that as students take charge of their own learning they should build a vision of what they want to do or be and includes some links to sites of some young people who had or have visions of where they wanted to go and are achieving their goals; belief systems role in achieving or inhibiting one's visions; and links to beliefs or goals of major organizations (such as the governments).
- Collaboration. The "Colaboration" section involves connecting between school systems and their communities in several example settings.
- Curriculum. This section contains links to a number of sources in various content areas.
- Technology Education. The "Technology Education" section extends concepts of technology use in education and includes evolving topics such as virtual reality, MUDs (Multi-User Domain), MOOs (MUD Object Oriented), WOOs (Web-oriented MOO), MUSHs (Multi-User Shared Hallucination), and virtual communities.
- Resources. This section includes many, many resources of various of types.
- Construction Shop. This section provides links to my students' attempt to tell about themselves and to bring together their concepts of what they value from the Web through their own home pages, and includes many links to help sites/sources for HTML and HyperStudio.

I hope to add a Play Room and a Chat Room to the Construction Shop. These two areas will provide places where students can come in and "play" and share ideas. For example, I find that it is a problem to get adults to feel free to experiment and explore. I would like to build a number of experiences where they experiment and explore. In such a Play Room, users can play with variables—where they try different values for variables and get different effects. They can gather data and build

projects from the data. They can transform shapes from one state to another.

Summary

This article discusses a number of issues related to using the World Wide Web as an instructional tool. Discussions include: developing Internet skills and major paradigm shifts that are facilitated by Internet capabilities. The article also considers a sample virtual learning center.

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Strong Women on the World Wide Web

by Winifred Wood

In this article, I narrate the sequence of activities I went through when integrating the Web into an introductory content-based college writing course called "Strong Women in Film." The class meets in a networked classroom; student computers are linked to the Internet (using Netscape) and to each other (using Interchange, the conferencing software that is part of the Daedalus Integrated Writing System, DIWE).

Late January

I am feeling both timid and bold as the semester begins. I have decided to do more than just browse the Web in my writing course this semester; I want the class to make a Web page. But I am worried that this activity will take time away from the academic writing that my students must do. I impose two constraints: I will not ask my students to learn HTML (it would take too much time away from their writing), and our Web writing will not involve personal home pages (because the focus of our writing program is not personal writing). Will this work?

Early February

Class is well underway. We've seen two movies (*Casablanca* and *Gilda*) and discussed them on Interchange. The students are now busy writing their first papers. Now is a good time to acquaint the class with the Web. I group students two to a computer and show them how to open Netscape and locate a search engine. I let them explore any site that has anything to do with film for a while, and then gradually steer them to sites related to the movies we are viewing in class. By the end of class, they are to settle on one site they particularly like, and post the URL and a brief description of the site into our class Interchange. I take the Interchange home to peruse. The following are some typical comments:

> *Leah:*
> http://www.cs.utk.edu:80/~ereynold/cgi-bin/swcut.html
> *Star Wars*!! The cut scenes from the trilogy

> *Katie and Maria:*
> We really liked the Humphrey Bogart tribute page. It was GOOD. The Ace Ventura page was rockin' too.

> *Carmen:*
> http://ourworld.compuserve.com/homepages/MMJE/hayworth.htm
> This home page is ALL Rita Hayworth. Lots of Legs.

All this for a class on women in film? It is time to get serious.

Next day I ask the class to reopen the log, read the comments by their classmates, and follow the links, deciding for themselves which pages are useful and how to extend their searches. By the end of today's class period, each group is to find a good page and write a brief review of it, considering its apparent audience and intended purpose, the value and reliability of its informational content, the effectiveness of its visual and textual content, and the power of its organization. Katie and Maria still like the Bogart page.

> *Katie and Maria:*
> We give the Humphrey Bogart page six thumbs up. It has a cool backdrop of black and white photos of Bogart. The black and white was in keeping with the tone set by Bogart's films. It was a tribute page, so there was little info, but lots of great photos. It was organized well with a table of contents of several movies, biography, photos, quotes (even a name-that-quote contest), and a comment section. There wasn't much sound, which would have made it even more interesting, but the layout of the photos was really innovative and well organized. There were lots of additional connections to other Web sites, and within the site it was very well connected. Overall, it was a very thorough Web site. It would have been nice if it had had more info, like reviews and definitely sound clips.

Carmen decides to stick with Rita Hayworth:

Carmen:
I ... thought the Rita Hayworth home page was excellent. It informs you and, perhaps, shows you through her black-and-white photos the type of beauty she emanates. I thought there was something lost in her color photos. She became sort of gaudy and maybe too real. The black and white pictures are much classier and fitting of her icon image. The page will link you to other big movie stars, if you wish, and also give a complete film and biographical background.

The class is deep in admiration of the visual effects produced on Web pages, and I am beginning to wonder what connection, if any, this will bear to the writing being done in our class. But I see that students are thinking well about organization, about the choices Web-page authors make in constructing their pages: they recognize, for example, that the black-and-white background of the Bogart page creates a visual and thematic coherence. I plunge ahead.

Mid-February

"What if we were to make a Web page for this class?" I ask. "What would it look like? How would we represent our thinking about women in film to the world?" I do not make a direct assignment (yet)—I just want to see what happens when I present the possibility.

The class becomes preoccupied with this question, in ways both serious and playful, and I find their thoughts about Web pages tucked away in odd corners of the class. Buried deep in an Interchange on Mildred Pierce, for example, I discover this thread:

Sophia:
Nancy and I were checking out the Coca-Cola Web page and we think we should have an interactive game on our class home page-"Kill Veda"; weapons include gun (the murder weapon), the cane from *Gilda*, Ilse's gun in *Casablanca*, the pills Monica was going to take in *Christopher Strong* ... any other ideas. I also think that *Thelma and Louise* would play very nicely into this game.

Sophia:
Nancy and I have now gotten over the Coca-Cola faulty Web page and are now wondering about the last scene [in *Mildred Pierce*] where Burt and Mildred are leaving and walk past two women scrubbing the floor. A few ideas are:

1. It's a new day and people and regular life is continuing.
2. The fact that it is women scrubbing is like a return to the domestic life for Mildred.
3. Mildred and Burt have again become another insignificant part of life.

Sophia:
Back to the Web.... WE (Nancy and I) need more images to attract people beyond academics, a wider variety of people. Some ways in which we can do this are:

1. Adding images.
   a. Background.
   b. Table of contents—have images of movies be the link to our movie homepages and to other relevant sites.
2. Of course the game (see earlier posting).
3. A picture of the class (we want to be in the Web).
4. Have an address to respond to, and give them some interchange to work with.
5. Change intro paragraph to something more eye-catching ... embellish first quote!
6. Keep a listing posted as far as new releases with strong women and TV listings of movies.

Hadley:
I agree, Sophia. I also think that there should be a suggestion page. A place for visitors to suggest more movies containing strong women (in their opinion) and have a place that they could explain themselves. Then we could even take their suggestions and maybe alter the course accordingly.... I think that might be really interesting.

Sophia and Nancy are attending to class discussion more than their brief foray to the Coca-Cola site would indicate. The second comment, in which they "return" to the main class discussion, is perfect: They point to a scene in the film and offer, in rapid succession, three possible interpretations of that scene, demonstrating proficiency at three skills I have been emphasizing in

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class—the ability to identify key scenes, to describe them, and to consider competing interpretations. They apply the same reasoning skills in their next comment about the Web page.

But Sophia and Nancy teach me some lessons too, here: I learn that it is very, very important for them, as thinkers and writers, to interact with a real audience, and to expand their reach beyond an academic audience. They tell me that they want their own presence felt ("we want to be in the Web"), that they value attractive presentation (we "need more images to attract people beyond academics, a wider variety of people ... something more eye-catching!"), and that they value the way knowledge can grow continuously through interaction with others ("A place for visitors to suggest more movies ... explain themselves").

Their discussion has drawn in a third class member, too. Hadley's final comment is especially exciting to me. In suggesting that we "alter the course" in response to readers' suggestions, she reveals the extent to which our course has become a conversation, with real stakes, subject to revision. Hadley, Sophia, and Nancy see themselves as active participants in the conversation, with the authority to consider feedback and make such alterations.

If this is all we do with the Web for the remainder of the semester, I will have found our work valuable enough.

Late February

But we must write our Web page! For one of our daily informal assignments, I offer students the option of designing the layout of our page. I receive a flurry of suggestions, and, from a student named Margaret, one careful layout, which I am able to translate into a first draft. Entitled "Strong Women in Film," the page features an image of Rosie the Riveter and a panel of six buttons, one for each of the six films we are studying in the course. For each film page, we lead off with an image, the film credits, and a plot summary. The page then has two brief discussions of the heroine of the film—how she appears at the beginning of the film and how she appears at the end—and closes with links to related sites.

We work out pages for two movies, Casablanca and Gilda. We are especially proud of the Casablanca site: It opens with the same image that opens the Bogart tribute page, a lineup of three men with Ilsa at the end, small, diminished, and silent in the presence of these three powerful figures. We link this image directly to the Bogart tribute page, and ask our viewers to consider the effect of this image when it appears on our page, which focuses on women in film.

It has been easy to find the text for our pages: We simply lift out portions of writing from our Interchange logs and formal papers. Our Gilda page, for example, contains this description of Gilda, from Margaret's paper:

> Despite Gilda's seductive power that lures Johnny in, once she is married to him, it is impossible for her ever to escape his domination. The full picture of Johnny's wrath and Gilda's loss of all power are seen in the hotel scene, when Gilda begs him to release her. She is emotionally wrecked, in contrast to the composed dominating man. When Gilda lies at his feet sobbing and pleading with him to let her go, he clearly holds her life in his hands. Despite the apparent control that she possessed over him earlier in the movie, his control and domination overpowers her as he determines her fate.

But it also still contains Carmen's comment from the Interchange log, now attached to a link to the Rita Hayworth page:

> Mark Edmonds' Rita Hayworth Homepage is ALL Rita Hayworth. Lots of Legs.

We decide that we like these differences in language, because it reminds us of the complexity of our own reactions to women in films.

Early April

Disaster strikes, but it brings with it one of those serendipitously teachable moments. Planning to work on our Web page in class today, we open our beloved Casablanca page, and follow the link to the Bogart tribute page. The images are gone, and in their place is an angry note: the author has been asked by the Ted Turner corporation to remove from the page all images to which Turner owns the rights. The students are sad ("It was such a beautiful page," they sigh). I am frustrated: It is so much harder to quote images than it is to quote text. We have to acknowledge our responsibility to comply with copyright law. All of our semester's talk about acknowledging and citing sources is brought vividly to life for us. We realize how much work it will be for us to include images on our page. I want to ask the students to compose letters requesting permission to use particular images, but I have

already assigned too much work for the course and the semester is rapidly drawing to a close. We resign ourselves, sadly, to a text-dense, image-poor page.

Early May

The Web page is near completion, and we take a half hour to critique it. The group offers suggestions thoughtfully. They want to rewrite the plot summaries, placing women at the center. You can discuss Casablanca with barely a mention of Ilsa, but the summary becomes much different if you place her at the center of your discussion, they observe. They are critical of the *Ruby in Paradise* page: It has too much text on it. But they like what the text says and don't want to sacrifice it, so they suggest a way to break the text up and layer it hypertextually. They discuss the background colors: should the backgrounds of all the movies be the same, establishing a coherent link among our movies, or should they be different, each background reflecting the movie it represents?

As I listen to their suggestions, I realize that their understanding of the visual and textual coherence of a Web page is reflected in the writing they are doing right now. In their formal papers, they are paying close attention to how they order chunks of text on the page. They take care to write a vivid and well-focused opener to the paper, they consider how the parts of the paper are connected to each other, and they are conscientious about citing sources.

I ask the class to write up their suggestions, so I will remember them. Here are some of the comments:

> *Maria:*
> I think the most important function of the Web pages is to heighten the awareness of the general public of women's roles in film.

> *Joon:*
> Although summaries which pull women to the front are a firm beginning, I do think the pages become most worth while by adding our own critical and perhaps controversial interpretation. I do think bits from our own papers on a deeper page would be a good way to do that. Beyond that, perhaps for each movie there should be a page where people can leave their own comments after having read ours .... That way we would not only be putting something substantial out there, but we would actually show how people responded to it.

> *Margaret:*
> I agree with what Moira said about how the Web page should be clear that it is discussing women's roles in movies. A page that explained some of the theories that we studied would be very helpful. Just like an "introduction to studying film from a feminist perspective" (maybe we don't want to use the "f" word though, maybe "introduction to theories behind studying women in film"). For example this page could explain some key things, like: the gaze, sexual power, patriarchal ideology. These things are key to understanding seeing movies from a woman's perspective, and would make our Web page more complete, educational, and also easier for a person who hasn't studied this to understand.

To every student in the class now, their writing matters—both their formal academic papers and their Web writing. They want their voices to be heard. They want to assert their positions, and they want their positions to have a presence in the world. At the same time, as Margaret's comments about feminism show, they are sensitive to audience. They still care, as a group, about the visual appeal of their page; they still want it to be playful and interactive. But, as their comments show, they are primarily concerned that the page have substance, and they speak with authority about what that substance should be.

July

The semester is over, the students have gone home, and I am still wrestling with our Web page. They can link to it from home, and they are eager to show it to their parents and friends. They send me e-mail, still offering suggestions and quotes. I am groaning under the burden of this infinitely expanding project. But that's OK. "Best of luck with the project this summer," writes Robin, "and I would be happy to assist you with it more next fall." The Internet expands time and space into infinity—and I have discovered that it expands teaching similarly.

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The Web site described in this article can be seen at http://www.wellesley.edu/Writing/Strongwomen/strong_women.html.

Information on DIWE is available at http://www.daedalus.com/.

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The Implementation of a World Wide Web Course on the Use of Internet Applications in the Classroom

by Marcos Silva

The introduction of telecommunications and computer technology in Canadian schools is growing at a phenomenal rate. Only a few schools had access to the Internet three or four years ago. SchoolNet, a federal government project to help schools get connected to the Internet, and the provincial and territorial ministries of education are planning to connect all 16,500 schools and 3,400 public libraries by 1998. Indeed, the original SchoolNet goal of linking 300 schools was surpassed one month after the launch of the program with over 600 schools connected. And although access is uneven and at times inequitable, present trends suggest that most Canadian schools will be connected by 1998.

There are several reasons why policy makers and educators have strongly supported educational networking. First, use of K–12 networks helps end teacher isolation. Teachers, possibly the group of white-collar workers most isolated from colleagues, are able to communicate with colleagues and with a growing user population concerned with educational issues (Tinker, 1993a, 1993b). Instructor and students can also experience the social learning that occurs in classrooms by way of asynchronous (e-mail) or synchronous (Internet Relay Chat) communication.

Second, preliminary research suggests that it is possible to implement collaborative learning projects with local or remote students (Fowler & Wheeler, 1995; Neilsen, 1993; Quintana, 1996; Riel, 1990, 1992; Riel & Harasim, 1994). Or as Fowler and Wheeler (1994) claim, "The use of CMC (Computer-Mediated Communication) changed the way the classroom functioned. In many cases, patterns of cooperative learning developed" (p. 91).

Third, students working with network technology have the opportunity to present their work to a real audience thereby situating the learning and giving it authenticity (Roschelle, 1992). That is, activities are contextualized making the learning deeper and more meaningful. Situated learning is helped by what is called teleapprenticeships (Levin, Waugh, Brown, & Clift, 1994) where computer networks help replicate an apprenticeship approach to learning. As Levin, Waugh, Brown and Clift state, "another important aspect of teleapprenticeships is that they overcome the physical limitations of traditional apprenticeships, which result in a single apprenticeship experience being conducted in a single physical location" (p. 150).

Fourth, students and teachers have access to a vast warehouse of resources and expertise. Arguably, the information resources found on the Internet are impressive and can complement and enhance the value of traditional classroom or library resources. The ERIC Web page and Gopher site, for example, archive a wealth of educational materials.

Fifth, feedback is immediate, both from the instructor and from classmates.

Sixth, publication of class materials in electronic format may incur lower costs, particularly distribution and updating costs. Seventh, assuming the availability of hardware, large numbers of students are able to take the course. Last, the course can be ongoing and have several instructors collaborate in the presentation and work of the course (cf., Neilsen, 1993, Reidlinger & Weir, 1995, Silva & Breuleux, 1993).

However, access to computer and telecommunication technology creates a host of demands and needs, of which support and instruction have been ignored. One of the most common complaints voiced by teachers is the lack of instructional support. For example, a survey conducted by Honey and Henriquez (1993) on educational networking found that most use of the technology was entirely self-taught (p. 8, 12). The absence of a districtwide plan led Honey and Henriquez to state that "The survey results strongly suggest that support for telecommunications activities at the school and district level is virtually nonexistent" (p. 12).

These findings are supported by a study on SchoolNet services conducted for the Canadian Teachers' Federation (MacLeod, 1995). For example, the study found that almost 50% of teachers surveyed reported no experience with networked computers and 24% reported only occasional exposure to networking activities (p. 12). Of importance, only 1.8% of teachers saw computers as irrelevant in their work while 53.9% stated that they needed to learn more about educational networking (p. 12). It is not surprising, therefore, to find in the conclusion of the report the recommendation that "SchoolNet should provide teachers with a series of teacher training sessions to acquaint them with SchoolNet and its services" (p. 84).

Although problems of equitable, affordable, and universal access to telecommunication technologies pose serious obstacles in the use of networks (Reidlinger & Weir, 1995), elementary and secondary school administrators are facing the challenges of how to introduce the technology to teachers and how to offer training seminars. This problem is further compounded by the lack of expertise and budgetary constraints, especially since investments in training and support can often equal or surpass the original investment in hardware and software.

The administrators of Newfoundland's Stem ~ Net, a project that aims to "provide support and services for K–12 and rural public college educators in the areas of curriculum instruction and professional development" (Stem ~ Net, 1994, p. 1) found a novel and successful approach to train teachers connected to their network. A mobile Ethernet training network travels throughout Newfoundland and allows teachers to use new Internet applications like the World Wide Web. However innovative the approach, the mobile network does not solve the problem of how to offer large-scale, ongoing seminars to all Canadian teachers.

The Design and Implementation of an Internet Resources Course

As appreciation of the Internet and of the benefits of educational networking grew among teachers, the McGill University Distance Education Program decided to introduce students to Internet resources and applications. Giving teachers the knowledge of the basic Internet applications and resources was the overriding objective of the course. Moreover, the course ideally would be offered over the Internet and make full use of its protocols and resources.

The original design of the course, which was based on workbook exercises and readings, was deemed inappropriate because it lacked sufficient interaction and asynchronous communication. Moreover, the dynamic and ephemeral nature of Internet resources made it a necessity that modifications to the course be implemented without delay. Finally, students had to be acculturated into network behavior and etiquette, an exercise that requires an applied rather than a theoretical approach. The new course faced a number of other challenges as well.

Although students are expected to have a basic understanding of computers and file management, it was decided that the project should give students some technical support and introduction to new Internet applications. Currently, home connections to the Internet and exercises like file transfers are greatly simplified. Still, some procedures remain complicated, particularly when students are inexperienced in using Windows/Mac software or UNIX shell accounts. To speed the acculturation into the new environment and to emphasize the conceptual aspects of the project, a method had to be available to the instructor to help students resolve initial technical problems.

As well, introduction of new technologies, particularly those that offer real-time communication and interaction, requires that users become accustomed with new environments. That is, the use of new technologies for teaching changes radically the means to instruct and guide students. Often, the role of teachers is modified from one where they are information providers to one where leading and guiding becomes the primary activity.

Moreover, use of the Internet also requires instruction on how to collaborate in virtual environments and on how to filter and process large quantities of data and information. Indeed, the problem of information processing and filtering is a major concern and many are questioning whether the information on the Internet is an impediment or an enhancement to learning (Duchastel & Turcotte, 1996, p. 2). The information overload problem is exacerbated by the problem of information authentication and copyright. At the present time, there is almost no quality control on the information posted on the Internet.

If seminar participants are novices, introduction to general online behavior and culture is necessary. The need for acculturation and "netiquette" should not be underestimated. Creating context in virtual environments

depends upon certain behaviors and adherence to rules. Finally, when introducing networking and computer technology, a humanistic pedagogical approach as opposed to a systemic-based pedagogical model appears to be more ideally suited (Silva & Cartwright, 1993) for students with little computer training.

However, two major problems arise when introducing and teaching networking technology. First, the Internet and its protocols are evolving at an unprecedented rate. The World Wide Web is only a few years old, with new software being introduced on a monthly basis. Furthermore, because the Web is able to integrate most other protocols, it is subsuming many of the older protocols like Gopher, Telnet, and FTP (file transfer protocol). These protocols, however, are still utilized by many technologically underprivileged schools that must rely on UNIX shell accounts or similar systems.

Such rapid change creates a situation where the student and instructor must be exposed to continuous renewal and new technologies and applications. A Windows-based task, for instance, assumes a great deal of knowledge from someone who uses text-based systems. Consequently, ongoing workshops geared towards the introduction of new applications becomes a necessity. Although small-group workshops and seminars are probably the most effective means for introducing new networking technologies and applications, they are unrealistic given the lack of expertise and resources, particularly because universal access to the Internet is the goal.

The second problem, then, arises as a consequence of the first: How can we offer personalized, humanistic workshops that deal with the constantly evolving, ephemeral, and dynamic environment of the Internet. Or, in other words, how can a school implement a program where learning and use of new technologies is maximized and is offered on a continuous basis to all of its teachers and administrators. And how can a school offer follow-up seminars, workshops, and user support in a time of severe and continuing budgetary constrains.

The Virtual Classroom and the Provision of Individualised Instruction

Simply stated, one of the challenges confronting Canadian schools is how to offer the provision of individualized instruction on a large-scale, ongoing basis during a time of severe budgetary constraints. Recent research (Butler, 1995; Ellsworth, 1995; Kearsley, Lynch & Wizer, 1995; Lewis, Whitaker & Julian, 1995; Reidlinger & Weir, 1995; Riel & Harasim, 1994; Spargo & Kelsey, 1996), however, has reinforced the findings of earlier studies on the benefits of networking technologies. New programming languages like Sun's Java and Microsoft's ActiveX have also increased the interactive potential of Web applications like Netscape. These languages make content on the Internet dynamic by allowing small applications called applets to be sent over the network and executed on the user's Web browser (e.g., Netscape, Mosaic, etc.). Interactive exercises and teleapprenticeships are possible when using these new technologies. These research findings become particularly important in Canada where distances are immense, access to telecommunications is inequitable, and expertise is available, but the tools to foster collaboration and dissemination of research are scarce.

Building on the original Internet course, the McGill University Distance Education Program decided to expand it to give teachers the knowledge to implement networking projects in their classrooms. The course would emphasize the conceptual aspects of educational networking while helping teachers deal with the technical problems associated with working in a virtual environment. However, the course faced several problems.

Although teachers in urban centers had easy access to the technology and expertise, teachers located in remote Northern regions of Canada lacked resources. Moreover, the traditional methods of distance education, mailings and fax, were ill-suited to deal with a dynamic and evolving environment like the Internet. Teachers needed hand-on experience, meaningful tasks, and technical support. Furthermore, because of the speed in the evolution of Internet applications, immediate feedback was required to maintain interest and to lessen frustration in learning and using the new technology.

To meet the above demands, it was decided to design a course to maximize the interactive potential in networking technology while allowing students to experience the social learning and interaction that occurs in a real classroom. The original and present course (Internet Resources: 432-408) emphasizes an apprenticeship mode of instruction thereby giving each student personalized and group attention. Finally, instructors and students are able to replicate the social learning that occurs in classrooms through the use of asyn-

chronous (e-mail) or synchronous (Internet Relay Chat) communication. Consequently, collaborative and group work is encouraged whenever possible.

During the first year of the course, e-mail was the primary protocol utilized. Gopher and the World Wide Web were still under development and unavailable to the general Internet public. Most students used UNIX shell accounts or an IBM mainframe mailer program based on Multi-User System for Interaction Computing (MUSIC) software. Students were required to use the primary Internet protocols, Telnet, FTP, and e-mail, and to locate materials in support of their final assignment. Use of e-mail, through an e-mail discussion group created for the course, allowed students to communicate with one another, with the instructor, and with persons not associated with the course.

From this initial course design, it became apparent to the instructors that the attractiveness and success of the course was the result of the interaction arising from the use of e-mail. This finding parallels many of the claims made for the use of e-mail as a means to promote classroom discussion and interaction. Students were able to work collaboratively, communicate with experts outside the classroom, receive course materials, initiate and participate in classroom discussions, and work under an apprenticeship mode. And, by using Telnet and FTP, students were able to search, locate, and retrieve a wealth of material in support of their work and projects.

With the evolution of Internet protocols, particularly the Web, the course encouraged students to shift from the use of UNIX shell accounts and other text-based systems to more interactive systems. By early 1995, teaching and communication were offered through a Web home page created exclusively for the course. Although the older protocols are still an integral component of the course, students are encouraged to forego their use, especially because Internet browsers like Netscape subsumes them, making it unnecessary to learn their complicated command syntax.

Still, the Web home page is designed to maximize communication and interaction. This is promoted through several means. First, the foundation of the original course, the electronic discussion group, remains an essential component of class activity. Students must post the answers to course modules on the discussion group and participate actively in the discussions. Second, students are able to communicate with their instructors using e-mail or Internet Relay Chat (IRC), an Internet application that gives students the ability to communicate synchronously. Third, a USENET-based reader news group was created so as to give students an alternative means to share expertise and knowledge. The advantage of a reader news group is that the information is easier to locate and retrieve. Fourth, a section on the home page allows the students to post their biographies, portraits, and interests. This category aims to create classroom memory while fostering classroom identification. As well, this category allows students to post their work for comment and feedback from others in the course. Last, students are able to create personalized home pages containing Gopher or Web sites found to be of interest or of use for their classmates.

There are three types of assignments that students must complete to successfully finish the course. The first is divided into six practical modules covering all Internet protocols: e-mail, Telnet, FTP, http, and Gopher. Here, students have the opportunity to deal with technical problems and complete applied exercises. For example, in a typical module, students must Telnet to the ERIC database, conduct a search on a topic of interest, save the file, and mail it to their instructor.

Students must also complete two brief assignments. In the first assignment, a full review of computer and telecommunication resources in their schools must be undertaken. In the second assignment, they must search the Internet for K–12 codes of behavior, compare and evaluate several codes, and create one for their schools. Both assignments integrate technical knowledge with conceptual issues, such as the following:

- What happens if students access questionable materials?
- Should parents sign the user code of behavior.

The final assignment offers students the possibility to research an issue of particular interest in depth. Many have taken this opportunity to implement projects in their classrooms. Others have used the assignment to lobby their school boards for more computer resources and funds. The development of a home page for their schools has also been a popular option. Whatever the assignment, it must be supported by research and deal with current issues and problems; in addition the following fundamental questions should be posed:

- Why implement a project?
- How can you evaluate the effectiveness of a project?
- How can you integrate traditional learning tasks with the new technology?
- Are there gender differences in the use of the Internet.

The course also strives to present different viewpoints and research. Persons that have had a role in the development of educational networking are invited as guest lecturers. Their presentations are given to students through the course electronic discussion group and are later posted on the course home page. Again, research suggests that guest lecturing can stimulate learning in an electronic environment (Cotlar & Shimabukuro, 1995). To date, the Honourable Frank McKenna, Premier of New Brunswick; Carol Baroudi, coauthor of the book *Internet for Dummies*; and David Johnston, Chair of the Canadian Information Highway Advisory Council, have participated in the course.

An additional resource that is appreciated by students is a virtual library that contains the full text of over 20 electronic journals on education. It also offers access to databases, full-text books and dictionaries, and help modules on the use of the Web browser Netscape. In addition to the library, students have access to full-text bibliography of course materials to help them complete their projects. The bibliography includes journal articles, books, reports and presentations.

To resolve the problem of telecommunication costs (many students have restrictions on their online time and others must dial long distance to reach the server) the entire course's Web page is archived on two disks. In this way students can copy the home page onto their hard disks and access course materials locally on their computers. This does not lessen the interactive potential of the course; they can always connect to other servers or send e-mail whenever the need arises.

Conclusion

The model discussed in this article, although developed and instituted for a university course, can be modified to meet the demands arising from the need to offer training and instruction in the use and navigation of new information and network technologies. That is, the interactive potential of the technology, whether based on Web applications or on text-based systems, is an ideal vehicle for introducing user seminars and workshops (McComb, 1994). Regardless of the objective of the seminar, whether for college credit, professional development, or continuing education, the Web and e-mail offer a cost effective and practical means for the provision of user support and instruction.

Again, it is the ability of students to communicate with each other, either one-to-one or as a group, and with their instructor that is the most valuable aspect of the technology. And, although Web applications are far easier to use and introduce, their absence because of the lack of new technology should not impede the design and implementation of electronic seminars and workshops; text-based systems can offer the interactiveness necessary for learning to occur. Even in technologically underprivileged areas, access to computer and networking technology can be scheduled and organized so that the maximum number of persons are able to participate in workshops and seminars. Electronic discussion groups and USENET reader groups continue to serve as powerful tools in the retrieval and sharing of knowledge and expertise.

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31

The World Wide Web and H.T.M.L. (*How To Motivate Learning*)

by Steve Skultety

Learning with technology, as opposed to learning about it, can help students become better learners. As an educator, one of my goals is to help students develop into learners. I see myself as a facilitator of learning, rather than a dispenser of information. Learning is a process rather than a means to an end. Knowing how to learn is often more valuable than gaining information. Students often lack the motivation to properly reinforce the skills to benefit from an activity. Our students are living in exciting and interesting times as technology starts to permeate peoples' lives on an unprecedented scale at a younger and younger age. Students do find technology highly motivating, so why not use it to help achieve outcomes related to learning, as opposed to pure content acquisition? As technology changes so rapidly, it can also help our students become lifelong learners in their efforts to keep pace with technological advances. Technology is obviously an excellent vehicle to promote learning.

The latest innovations in computing technology are the Internet and the World Wide Web. The Web has grown tremendously in popularity and impact as it has evolved into the most potent vehicle in computing history for sharing information on a global scale. Learning how to publish a Web page on the Internet would be a useful skill for our students to possess, but it would also be an excellent way to develop learning skills.

How do we get the kids excited about this activity?

Easy, hold a contest and give away some great prizes. This was the rationale behind the "Canadian Home Page Olympics" held on Canada's SchoolNet, a national educational Internet service operated by the federal government in Canada.

SchoolNet challenged Canadian students in Grades 6–12 to construct and post a home page on the Internet. The pages were judged and prizes awarded to the winners. The contest was sponsored by Sun Microsystems, Microsoft, and Apple Computers. The participants were divided into two categories based on their grade levels. The junior category was for students in Grades 6–8, and the senior category was for students in Grades 9–12. Prizes for each category consisted of a SPARCstation 4 workstation from Sun Microsystems, a QuickTake 150 digital camera from Apple Computers, and Office and Windows '95 software packages from Microsoft. A prize list like this goes a long way in the motivation department. Now that we had the students' attention, the learning could begin.

SchoolNet's Web site contained all the information the students needed to know about the contest. Part of the site outlined the process of producing and posting a Web page on the Internet, giving all novices a common baseline of knowledge. Armed with this information, now all the competitors had to do was digest the material and learn how to produce a Web page. To a novice, this can be quite a formidable task. To the experienced Web page designer, the entire process is quite simple. The goal was to motivate students to acquire this skill, allowing them to be producers of information, as opposed to being just consumers of it. Producing the final product consists of numerous procedures that are seemingly unrelated. However, by completing the task, the students will have learned not only how to design and post a Web page, but they will have had an opportunity to learn about learning.

Producing a Web page takes the students through all six levels of the Cognitive Domain in Bloom's Taxonomy of Educational Objectives (Gronlund, 1982):

1. Knowledge: Remembering previously learned material.
2. Comprehension: Grasping the meaning of material.
3. Application: Using information in concrete situations.
4. Analysis: Breaking down material into parts.
5. Synthesis: Putting parts together into a whole.
6. Evaluation: Judging the value of a thing for a given purpose using definite criteria.

The skill of producing and posting a Web page on the Internet involves mainly the first three levels of the

taxonomy: knowledge, comprehension, and application. However, to acquire this skill, students had to analyze, synthesize, and evaluate the process. Moreover, as the pages were to be judged, the students also had to concern themselves with the layout and design of the page, again bringing into play the more complex levels of this domain—analysis, synthesis, and evaluation. The eventual quality of the page would be greatly influenced by the more complex behaviors required in the top three levels of the taxonomy.

As educators, we are always searching for activities that engage students in cognitive behaviors requiring higher level thinking skills . Producing a Web page is certainly such an activity. It is a unique process because of the nature of its formatting codes or language, HTML. A Web page is generated from an ASCII text file into which tags have been entered to format the text, insert images, and control the layout of the page. A browser is then used to view or render the page as determined by the tags. In addition to the textual content of the page, graphics play an integral role in the look and feel of the site. Images can also be used to visually reinforce the content of the page. Knowledge of graphics programs used is also important, as is evaluation of the graphic to be used. Finally, students must consider how all the elements of the finished product work together.

The actual HTML document looks nothing like the Web page it was designed to produce. As a student becomes more familiar with the effects the various tags have, they can begin to render the page mentally, resulting in abstract thinking. By loading the page into the browser, students could check to see whether their mental rendering matched the computer's interpretation of the document's source. If it didn't, it could be because of a typographical error in a tag or a misunderstanding of the effect of a certain tag.

With the recent advent of WYSIWYG editors for HTML documents, the page is displayed from a browser's eye view as it is being developed. This will serve to reduce the degree of abstract thinking associated with Web page design. Fortunately, not everyone will adopt this technology. Some people will still prefer to work with the source code directly.

Students had to rely on their own judgment as to when they had developed the final version of the page that was ready for entry. The URLs of the entries were not made public until all the pages were judged. As a result, students could not check what their competition had created. They had to rely solely on self-evaluation based on the criteria that would be used to judge the entries. However, they were free to surf the Web and view designs of other Web page producers. In actuality, many of the of the contestants produced in-depth Web sites as opposed to a Web "page."

Once the students were satisfied with the final products produced on their desktop computers, the Web pages had to be posted on the Internet. In our case, this brought the need for some knowledge of the UNIX operating system into play, on which the servers that store the pages run. Not all servers use the same protocol for storing Web sites. Students needed to find out the protocol used on their server.

Directories that contain the various text, graphics, and, possibly, other file types needed to be created. Consideration had to be given to the directory structure of the site. Would all the files be housed in one directory, or would various directories need to be created to store the different file types or subtopics of the site? As well, students also needed to know how to use an FTP program to upload their files to the various directories on the server. Once uploaded, permissions would have to be set for the various directories and files so others on the Web could gain access to their site.

Posting a Web page on the Internet consists of numerous steps and procedures. To complete the task, the entire process must be analyzed and then synthesized. However, before a Web page can be posted, students need to gain the knowledge required to complete the various steps involved and comprehend them. They must then apply what they have learned and evaluate the final product. (See Figure 1.)

When integrating technology into the curriculum, educators need to consider how the acquisition of a particular skill set can be used for developing learning skills. We cannot predict the skills students will need in the future, but knowing how to learn will be a valuable asset.

Teaching students how to learn should be more important than the knowledge itself. If students know how to learn, they can fill their "toolboxes" with skills that are relevant to their needs. Students with toolboxes full of skills that are not relevant are useless. However, enabling students to fill their toolboxes with relevant

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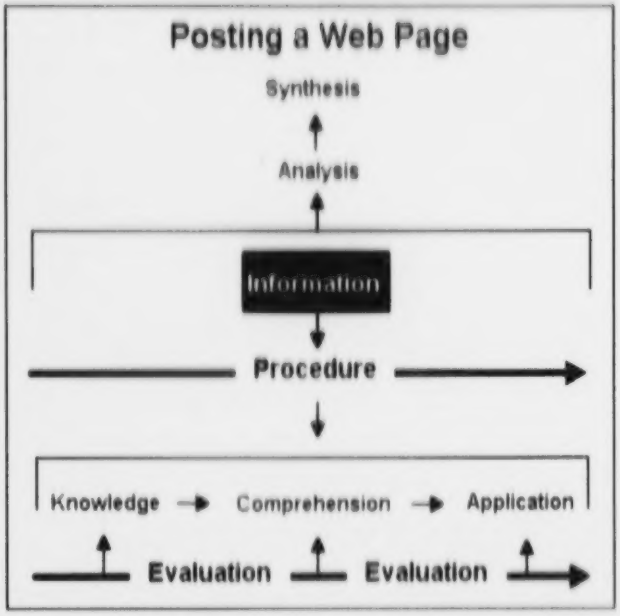

Figure 1. The steps for posting Web pages

skills opens the door to personal productivity. SchoolNet's Canadian Home Page Olympics was a step in this direction.

Kevin Nachonechny, winner in the senior category, developed a site dealing with original research in relaxation. Not only was Kevin's content original, he also made all the graphics from scratch. No clip art was used. Sajeeth Cherian, winner in the junior category had a great site dealing with the Sailor Moon cartoon characters. It had animated GIFs and sound clips. His site has had over 55,000 hits. Not bad for a seventh grader.

Watch for information on SchoolNet's Web site for another CHPO coming in February 1997.

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Web Site

The links to the pages entered in this year's contest can be found at http://www.schoolnet.ca/english/virtprod/CHPO/chpo3.html.

Steve Skultety coordinated this project for Canada's SchoolNet. He can be reached at Charlesswood Junior High, 505 Oakdale Drive, Winnipeg, Manitoba R3R 0Z9, Canada; skultety@mbnet.mb.ca.

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NewsBits

edited by Gleason Sackman

New Link: Argus Clearinghouse

The Argus Clearinghouse (formerly known as the Clearinghouse for Subject-Oriented Internet Resource Guides) has a new address:

http://www.clearinghouse.net/

If you are responsible for a link to the Clearinghouse, please update it, becasue the old site's pages disappeared in early September.

Basic Information About the Clearinghouse

Begun in 1993, the Argus Clearinghouse is a rapidly growing collection of over 1,000 topical guides to the Internet's information resources. Created by librarians and other information professionals, these guides are useful to researchers interested in hundreds of subjects. The Clearinghouse provides users with browsing and searching capabilities. Guides that qualify for acceptance in the Clearinghouse are rated for quality, and our staff ensures that the Clearinghouse points to the most up-to-date guides.

You Can Participate: Submit Your Own Guide

You can have your own topical Internet resource guide included in the Argus Clearinghouse: Go to the following page to see our definitions of what a guide is and how to get yours included in the Clearinghouse:

http://www.clearinghouse.net/docs/submit.html

Coming Improvements

We are in the process of improving the Clearinghouse by adding second-level categories to the subject tree for better navigation, revising keywords to enhance searching, and refining the searching interface. These improvements will happen over the next two months.

Finally...

How can we make the Clearinghouse better? Please let us know by filling out a brief survey. The survey is located at:

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Free Access to Multimedia Database for Librarians & Educators

We recently introduced the Combined Online Multimedia Database (COMD) at the American Library Association Conference in New York. It is a free database for anyone on the Internet, but it was specifically designed for librarians and educators to learn about multimedia titles that are appropriate for there schools, institutions and media centers.

http://www.cbedatabase.com

"COMD" is underwritten by those publishers who are participating in the database. Our aim is to grow the site to include reviews and awards (if any) on all titles listed. The site is still very young, but we hope to have upwards of 1000 titles in the database by this time next year.

There are links to publishers' home pages along with links to distributors from whom you may order the titles listed.

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IN THE CLASSROOM

Deadline: December 15, 1996

Much of our work as online educators acknowledges the impact that access to information has on students and their work. We often see work that considers the benefits of this access on independent learning or the broadening of perspectives as online learners locate their understanding of the world in new ways.

In this call, *T.I.E. News* is looking for submissions that consider the impact of online experiences on classroom learning and teaching practice. What is the impact on local communities as they mediate distant experiences in the familiar setting of the classroom.

INTERNET & THE CURRICULUM

Deadline: February 15, 1997

Educators everywhere, it seems, are experiencing calls for change — at times dramatic change — from a variety of arenas. Reform, innovation, accountability, doing more for/with less while preparing for the new millenium create conflicting sets of demands.

In this call, *T.I.E. News* is looking for submissions that consider how online learning initiatives are integrating into the curriculum. Is your work well received, or shaping new directions in your institution? How is it fitting into existing programs (well or poorly), and what can we learn from your assessment of experiences to date?

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Editor's Message

Trevor Owen

In The Classroom

Much of our work as online educators acknowledges the impact that access to information has on students and their work. We often see work that considers the benefits of this access on independent learning or the broadening of perspectives as online learners locate their understandings of the world in new ways. In this call, T.I.E. News is looking for submissions that consider the impact of online experiences on classroom learning and teaching practice. What is the impact on local communities as they mediate distant experiences in the familiar setting of the classroom.

Our last issue (8#1) featured articles on the theme of "Learning and the Web," which considered the impact of Web-based learning affects classroom-based experience. In this issue, *T.I.E. News* contributors look the other way, and focus instead on the ways in which teaching and learning practice in the classroom shape and define online initiatives.

One of the articles in our last issue provides a useful link to this theme. You may recall that contributor Harpa Hreinsdottir (1996) considered how the Web provided "new ways to teach old books" in her work on medieval Icelandic literature and mythology. She noted how

> the students felt that we were all working as one team to make something important and that we were all doing our best, instead of working in the usual "teacher-student hierarchy" (p. 13).

The "usual teacher-student hierarchy" that Harpa saw surfaces again in the description of an English project developed by Sylvia Michelizza, a student teacher at the time of this project, and Marieken Molenaar, who was in her first year of teaching. Sylvia and Marieken attended the Faculty of Education at York University, where I work. (Regular readers of *T.I.E. News* may recall Marieken's name from the winning entries in the 1995 Telecomputing Activity Plan Contest. She was a participant in the "ESL Writers Online" project.) The project they describe in their article operated in their respective schools in the spring of 1996. It serves as a useful example of what is possible when educators who are as new to teaching as they are to technology seek to inform their professional practice as they witness how classroom learning is affected by issues of technology. The constraints they faced lead them to implement the project in different ways, and to build helpful conceptions of online learning in both student-mediated and teacher-mediated models.

In "Implementing Wireless Networks in the Educational Environment," Marlyn Kemper Littman, of the School of Computer and Information Sciences at Nova Southeastern University in Florida, considers the impact and feasibility of implementing wireless networks as part of "fixed campus network infrastructure." This article is a "must read" for those considering the adoption of similar technology. It provides practical information, as well as insights into key questions, such as:

- What are the fundamental characteristics of wireless technology?
- How are wireless networks currently used? What are projected services?
- Can wireless networks serve as a framework for emerging applications?
- What are the key advantages and disadvantages associated with wireless implementation?

For more information, you may want to refer to another article on wireless technologies in 7#4 (Coppolla, Toth, Long, & York, 1996).

Graduate Student Research

I am also pleased to note that the first submission in response to *T.I.E.*'s call for articles from graduate students appears in this issue. David Beckstead, a doctoral candidate in the Faculty of Education at Simon Fraser University in British Columbia offers a description of his Composers in Electronic Residence (CIER) program in "Music, Technology, and Textual Presence." I have

known David personally for a number of years, and worked with him in the Writers in Electronic Residence program and in his early work developing CIER.

The call for graduate student research is ongoing, and I invite students and supervisors alike to submit their work for T.I.E. Information appears on the inside back cover.

Online Mentorship

Our newest call is for articles on "online mentorship" (see the inside back cover for specifics). Much of the work undertaken in our field nurtures mentorship relationships in one form or another and, although I would hope to see a wide variety of interesting project descriptions, I also want to encourage readers to consider how online interactions foster mentorship possibilities that were, perhaps, not intended. I am thinking of notions like the "learning from a child" approach advanced by our colleagues in language learning (e.g., Atwell, 1987; Calkins, 1983), and how professional understanding may be nurtured from both anticipated and unanticipated sources.

Name Change & Regulars

I'd like to follow up on the potential name change for this journal. The possibilities include the *Journal of Online Learning* and the *Journal of Networked Learning*. This discussion appeared initially in 7#4, and I'd appreciate hearing from readers concerning your preferences. Please e-mail me at tie@edu.yorku.ca.

And, of course, our usual features appear in their usual spots.

Trevor

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Vicki F. Sharp, Martin G. Levine, and Richard M. Sharp
The Best Web Sites for Teachers
374 pages, ISBN 1-56484-098-0
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President's Message

Chuck Lynd

The articles in this issue underscore the impact that online activities are having in the classroom, and they offer significant insights into education in the future when schools will routinely incorporate today's new and emerging models of teaching and learning. These changes are exciting and full of promise to those of us in positions of leadership, whether we work in the classroom or support the work of innovative teachers through training, research, or development of communication networks and services.

At the same time it is important to recognize that there is a downside to any significant change: Getting from here to a genuinely different future is likely to be a messy, even painful process. School systems, like other institutions in society, are undergoing leadership pressures to sort out new strategic directions, restructure and flatten organizational hierarchies, redefine roles, invest in computers and communication technologies, and still find time to conduct and manage the day-to-day operations of teaching and learning. We all know this is not an easy juggling act!

So how can school leaders manage the change process in ways that support and encourage innovation that takes advantage of new technologies and telecommunication networks in the classroom?

A report by the U.S. West Foundation, which was published last year in *Education Week* (Foa, Schwab, & Johnson, 1996), identified a number of principles that can help guide teachers and administrators in the transition from traditional classrooms to ones that are more like those described in *T.I.E. News*. The following are some examples of change strategies that the study found to be successful regardless of the particular setting or amount of technology funding available.

- Identify and support the zealots. Transformation will follow in their wake. Zealots (i.e., enthusiastic advocates for the integration of technology into the classroom) are often teachers, but they can also be administrators, parents, or school board members. In traditional organizations, the zealous innovator is often isolated or even penalized for his or her extra efforts. The message here is to recognize the value of the zealot's energy and commitment so that it can open up new opportunities from communities, corporations, and national funding sources. Change, and eventual transformation of the system, starts with a small minority that needs to be encouraged, not squelched.
- Training is at least as important as technology. Budget for it accordingly. It is never enough to "deploy the technology." Today's leaders recognize that the changes sought are about teaching and learning, not about technology. Unfortunately, it is still easier to ask for funding for computers and wiring than it is for resources to provide training and technical assistance. Wise leaders, however, will design and fund a support system that emphasizes relationships. Training strategies that include coaching and modeling are critical for success.
- Never underestimate how long it will take to get connected. The pace of change, especially the rapid evolution of technology, means that virtually all installations of technological infrastructure are going to follow a rocky path. Do not rush the implementation; instead, wait patiently until the entire system is in place and debugged before training teachers. This avoids the inevitable frustrations of trying to work with a system that has not yet been customized and optimized for a particular setting.
- Move forward with those who are ready. Don't waste time, money, or energy on those who are not yet interested. Nurture the innovators and let the changes percolate on their own, allowing relationships between teachers to dictate the spread of the new approach or project. Whole-school or whole-district endeavors reflect a traditional mindset that treats everyone "equally," but ends up wasting a lot of equipment and effort on teachers who are simply not ready by temperament or training to make use of the innovation.
- Teachers require changes of huge magnitude in educational philosophy, classroom management, and curricular goals to integrate technology into their curricula. Many administrators assume that if teachers are taught how to use computers and telecommuni-

cations and provided the necessary equipment, classroom teaching and learning will improve. The reality is that the integration process is very complex and involves dozens of small and large adjustments that vary considerably from any given teacher's current practice. Teachers must be comfortable with a constructivist or project-based, problem-solving approach to learning. They must be willing to trust students to learn and progress at their own pace, and they must become comfortable in a learning situation that they can influence but cannot control. Although some teachers will adapt readily, others will be threatened. Attempting to force-fit the new practice will only result in greater stress and lower morale.

When the winners of each year's SIG/Tel Telecomputing Activity Plan Contest present their winning classroom activity plans at our Tel•Ed/Multimedia conference and at NECC, the value of the principles outlined in this article are made abundantly clear. The stories they tell, like the articles in this issue, demonstrate successful models and pathways to the future. Let's keep being zealots for network learning opportunities, but at the same time manage the change process wisely.

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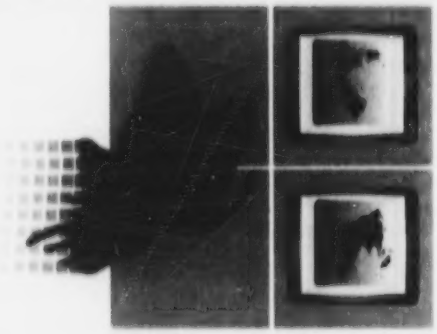

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The Newtonbrook/Northview Initiative—A Teleconferencing Project in the English Classroom

by Sylvia Michelizza and Marieken Molenaar

The Faculty of Education at York University in Toronto takes pride in promoting the application of telecommunications technology in the classroom. As recent graduates of their concurrent education program, we share this focus on the potential of this tool for learning, especially in the English classroom. For several months, we had both been independently searching for a suitable partner to initiate an online writing project. During the spring of 1996, we were introduced by a mutual acquaintance at the faculty, and soon after, our project was born. Despite initial obstacles, the project provided an overwhelmingly positive learning experience for three senior English classes: Marieken's two classes at Northview Heights Secondary School, her first teaching position; and Sylvia's larger class at Newtonbrook Secondary School, her final practicum placement. (Both of these schools are in the North York Board of Education.) Through NYNET, the board's FirstClass telecommunications network, a conference was created for the project, and a link was established with the Faculty of Education at York University where Sylvia was a teacher candidate at the time.

Project Goals

The Newtonbrook/Northview Initiative was established as a short-term online conference to last four weeks. The primary goal was to stimulate learning through the implementation of telecommunications technology in the English classroom at the senior level. Further, we wished to provide students with an opportunity to develop social and intellectual skills in their own forums for writing, academic dialogue, and peer editing. The project's goals dovetailed with the writing component of the English curricula at both schools, despite its midsemester introduction. Figure 1 shows the original outline for the project.

The Project

The project consisted of four steps. Students were to do the following:

1. Post a new "work in progress" on a topic and in a format and genre of your own choice, accompanied by a short autobiographical introduction.
2. Give critical responses to two pieces after reading the creative works posted by the class at the other site. Look most closely at form and content.
3. Reply to each critique you received, and edit your creative work incorporating the suggestions given.
4. Repost the edited work, along with a short goodbye.

Students were reminded that the intent of the response component was to generate a serious academic dialogue demonstrating critical thought, maturity, and the ability to give negative feedback (if required) in positive terms. They were given the project outline shown in Figure 1, which included the project expectations, and a project flow chart (see Figure 2), which served as a visual explanation of the scope and sequence of the project.

Two Experiences—One Product

Although the demographics of the three senior-level classes in the two schools were similar and represented a cross section of the multicultural diversity of Metropolitan Toronto, the models of access differed significantly. Because Northview had more modem hook-ups available for student use, theoretically each student had direct access to the conference, an approach we dubbed the "student-mediated model." Marieken's involvement included giving instruction in the use of the FirstClass software, discussing the calibre of responses expected, assisting when students had technological

Outline for the N/N Initiative

1. An Internet link has been established between Ms. Michelizza's and Ms. Molenaar's ENGOAO classes at Newtonbrook Secondary School and Northview Heights Secondary School for a three-week intensive writing conference.
2. The writing conference will contain student-generated works thematically linked to the novels studied in class.
3. Project rules:
   - Students will post their creative work in two stages: once as a work in progress, and once as a polished piece.
   - Students will respond to at least two creative works posted.
   - Students will acknowledge and discuss each response they receive.
4. Project goals:
   - The project is designed to be a serious dialogue between two OAC classes.
   - Students must demonstrate critical thought in their responses, giving appropriate feedback. Vague responses that include such words as "nice" and "good," or similar phrases, are therefore inappropriate and will be penalized.
   - Negative feedback must be couched in positive terms. For example, the comment, "that was terrible" is unacceptable, can be rephrased as "that line could be edited in this or that way."
5. Project outcomes:
   - Students will have a forum for their own creative writing.
   - Students will develop an awareness of the applications of electronic communications.
   - Students will practice and gain confidence in peer editing and in giving and receiving constructive feedback on student-generated works.
   - Prior student learning in writing and peer editing will be reinforced.
   - Students will gain a heightened awareness of the greater school community.
6. Students agree to adhere to the rules of conduct established by NYNET. The teachers moderating the conference reserve the right to remove students who do not comply with the regulations of the project. Any such student will receive a grade of 0.
7. Students will hand in a portfolio containing printouts of all their postings, including work in progress, polished work, and all responses given and received. The portfolio will be evaluated as follows:
   - Quality of responses given /10
   - Quality of acknowledgements of responses received /10
   - Quality of the final piece
     - Form /10
     - Content /10

Figure 1.

problems, and evaluating the final product. The responsibility for completing each stage of the project, however, was completely shouldered by each individual student. Students were given liberal computer lab time, but completed most of their assignments either through their own connections at home, or on one of the six modem hookups in the school. Rather than completing individual portfolios as originally planned (see Figure 1), students were responsible for placing a hard copy of their creative work and responses in a class binder for reference and evaluation purposes. In spite of this apparent ease of access, however, students still experienced bottlenecks at the modem locations, partially through their own poor time-management strategies, but also because of long lines.

At Newtonbrook, on the other hand, the steps taken to accomplish the same final product were quite different. Like Marieken, Sylvia gave a similar initial instruction regarding expectations and technology to be used. However, students completed the assigned work within what, by necessity, became a "teacher-mediated model." Not only was modem access limited, but direct access to the conference was impossible during class time. In addition, lab facilities were unavailable, except during the lunch period. Sylvia was, therefore, forced to mediate the process by printing, copying, and distributing all communications received from the Northview students. In addition, she used her own network account to send all communications by the Newtonbrook students through a process of "cut-

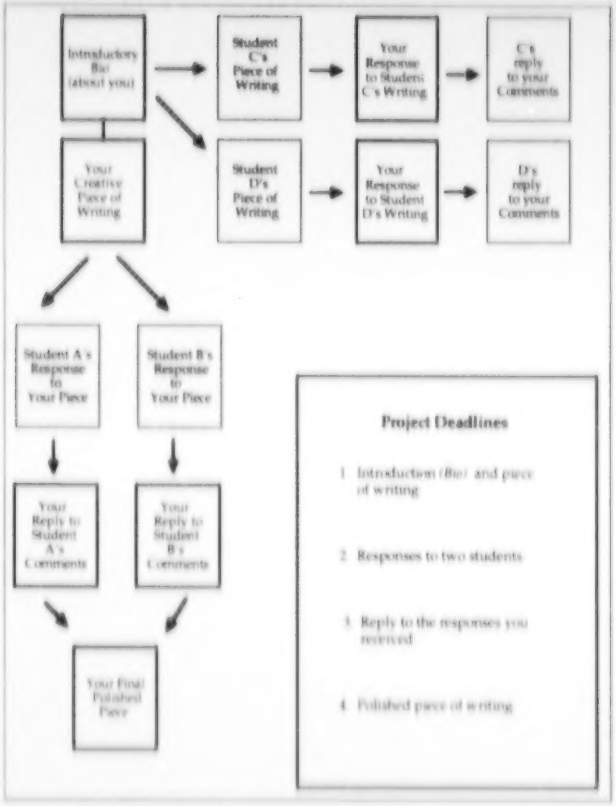

Figure 2. Project flow chart

ting and pasting" the documents they had saved on one of the three disks she circulated. The disks and all hard copies of the writing produced in the project were organized in a binder to provide students equal access to the conference. Students were given copies of postings from their partners to assist in formulating their replies. They completed their creative works and responses in the computer lab on their own time, usually during lunch or on spares. Even though the project models varied significantly in each school, the final results were equally successful.

Student Learning

The writing generated by students during the project included poetry, interior monologues, satire, short stories, essays, an Internet handbook, storyboards for film shots, and revised endings for stories. Students responded enthusiastically to the freedom of choice inherent in this project, and commented that "It was total [sic] cool of you to treat us like adults." The discourse between students evidenced an increasing maturity, as students learned to give and receive meaningful peer critiques. Initially, some of the responses reflected a misunderstanding of the standards established in the project outline, and seemed thoughtless and blunt. Later on, these responses became more diplomatic in tone and far more substantial in content as students learned to express their critical thought productively. For ESL students in particular, this project provided a forum for communication not usually available to them. Communicating with a computer, even in the teacher-mediated model, facilitated the expression of critical thought without interference. At the end of the project, for example, one student, who had written an involved piece of satire, thanked his partner for being "morally supportive" in his response. He and his partner, both ESL students from different cultural backgrounds, benefited from the exchange and their unique abilities to comprehend each other's "incomprehensibilities." In this case, the computer facilitated a communicative process that a face-to-face interaction would have hindered. An example online critique appears in the sidebar on page 9.

In addition, students actively sought opportunities for peer consultations during lab sessions and in class, especially for the writing and revising process. As well, students with significant technological expertise supported their classmates by mentoring those who were unfamiliar with the technology. This gave the class computer "wizards," especially at Northview, a chance to "shine" and contribute to building a sense of community in the class. In addition to these academic and social gains, the dialogue between the students helped eliminate social barriers as well as misconceptions about the "sister" schools. At Newtonbrook, the initial reluctance to work with Northview changed to an enthusiastic participation. In fact, it is important to note that the number of interactions between the students exceeded our expectations and the project requirements. The positive results were succinctly coined in one student's evaluation: "I liked the idea of interacting with another school."

Overall, the project gave students the opportunity to:

- Develop computer literacy and telecommunications skills.
- Build mentoring experience.
- Practice thoughtful editing in response to critiques.
- Develop social competence in a cooperative environment.

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A Sample Online Critique

Northview, April 30, 1996—
Nana's Original Paragraph
(Nana describes her paragraph as an "analogy to a specific object.")

He was the best-looking one that I saw today. He was sleek, cool, and dangerous. His body tanned with colour, immediately caught my eye. His features presented a strong body and great power that was to my liking. He stood out from the rest that were there. Among his friends he looked like a model that was on display. When I approached him, I examined his physique, the contour of his body was soft yet firm. I fell in love. I knew in this relationship, I was in the driver's seat.

Newtonbrook, May 10, 1996—
Anna's Response to Nana
(Note how Anna describes her confusion about the analogy and suggests possible changes.)

... At first I didn't know what you were talking about ... my guess is that you were describing a horse.

One question that I did have is why did you use "tanned with colour"? This is a great way to personify your object but assuming it is an animal perhaps the adjectives "glowed" or "radiated" would be better.

Another little suggestion, "He stood out from the rest of them" instead of what you wrote—to the reader what you wrote is a little awkward.

... At the end of your writing I am left with the question of why being in the driver's seat is so important to you.

Newtonbrook, May 10, 1996—
Elizabeth's Response to Nana
(Note how Elizabeth misunderstands the analogy and offers concrete suggestions for change.)

I truly enjoyed your description. I can actually picture his overwhelming masculinity.

In the third sentence, instead of "with colour" use an adjective, "glistening." The sentence will then read, "His body tanned and glistening immediately caught my eye."

In the final sentence " I knew (that) in this relationship, I (would be) in the driver's seat."

Northview, May 21, 1996—Nana's Reply to Elizabeth
(Note how Nana clarifies the misunderstanding and incorporates the suggestions given.)

You are right I should use a different adjective in my third sentence. Anna mentioned that to me also.

I think you missed my analogy. I was relating a car to a guy and that's why I said "driver's seat." I was trying to describe how the car looked like a guy. But you had to know that I was talking about a car.

Northview, May 21, 1996—Nana's Reply to Anna
(Note how Nana answers Anna's questions, agrees with her responses, and asks for confirmation of her final choices.)

I do agree with you that I should have said "he radiated with colour." Do you think I should mention what colour he is? Maybe that would change the word that describes the colour. How about "his body bright red from the sun"?

Do you want me to write "He stood out from the rest of them" instead of "He stood out from the rest that were there"? I guess you're right it is awkward. I have trouble with that. I have the idea but when I write it down, it comes out weird.

... by being in the driver's seat, you have control of everything, steering, radio, and speed. The other reason why I said "driver's seat" was to give hints to what I was talking about. I wanted the reader to see that it was a car.

Northview, May 21, 1996—Nana's Revised Paragraph
(Note how Nana includes suggestions given by both partners in her revisions. Revisions are shown in underlined text.)

He was the best looking one that I saw today. He was sleek, cool, <u>and looked</u> dangerous. His body, <u>radiating bright red from the sun</u>, immediately caught my eye. His features presented a strong body and great power that was to my liking. <u>His every curve was smooth and his eyes were bold</u>. He stood out from the rest <u>of them</u>. Among his friends he looked like a model on display. When I approached him, I examined his physique, the contour of his body was <u>firm and he had a nice bumper</u>. I fell in love. I knew in this relationship I was in the driver's seat.

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- Develop personal time-management skills as well as a strong sense of responsibility and commitment.

Requirements for Success

One major obstacle to the success of the project was the unavailability of technology. Especially at Newtonbrook, modem hookups were nonexistent, and forced the implementation of the "teacher-mediated model," a time-consuming simulation of the teleconferencing experience. Students were dependent on the teacher to track their progress and remind them of due dates for the various stages of the project. As a result, they did not develop the same type of independence and learn the same type of time-management skills as the Northview students. They did however, demonstrate a high level of maturity through their flexibility and sense of responsibility in accomplishing project goals within their own contexts. Despite the lack of independence, the process did ensure that the Northview students received their responses quickly and efficiently, helping maintain enthusiasm for the project. Although this mediated adaptation provided a measure of interactivity and student ownership, the preferred model, such as that used at Northview, provided students with the essential interactive element offered by telecommunication. However, both models offered equal opportunities to achieve the academic goals that were at the heart of the project.

A critical element for the success of a project such as this was the rigid adherence to deadlines set for the various stages. Our project fared reasonably well, despite some feelings of abandonment by Newtonbrook students, who failed to receive timely responses from their Northview counterparts.

Another major obstacle was student apathy and resistance. One Northview student's complaint that "This project has proven to be a big pain in the neck, as I am not able to complete this so-called project in a satisfactory manner" may reflect the frustration felt at the inability to use or access computer technology. Responses such as "Even though this project was time consuming, it allowed me to see how useful and amazing computers are," were much more common, and indicated how student interest grew out of hands-on practice. At Newtonbrook, for example, one student who rarely attended classes, began to appear on a regular basis, asking, "Miss, did I get any responses?" Clearly, the interactive element of the project had piqued his interest and had drawn him back to class.

Although most of the obstacles were successfully overcome, the project goals would not have been achieved without positive departmental and schoolwide support, especially from the computer departments at both schools. Both at Northview and Newtonbrook, initial skepticism by colleagues gave way to full support of the project and commitment to continued support in the development of the available technology. Commitments were also made to continue to use communication technologies as tools for learning in future curriculum planning.

Conclusion

Was our project a success? We think so. Our project can be adapted to suit student needs at various levels, particularly those who are less motivated to write and need to see the relevance of school projects to their personal lives. We feel our approach was an excellent motivational strategy for students who were uninterested and did not excel in the traditional classroom environment. We found that all students took more time and put more effort into their work when they knew it would be read by an audience of peers.

Would we do it again? YES! With some modifications, of course—but the adaptability of the project and the potential it holds for student learning is too important to dismiss.

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Implementing Wireless Networks in the Educational Environment

by Marlyn Kemper Littman

Implementation of wireless networks facilitates instantaneous information access regardless of the user's location and results in new options for supporting educational applications. However, debate persists in academic circles about the feasibility of incorporating wireless technology into the fixed campus network infrastructure. This article examines wireless network capabilities and describes approaches for wireless network design and deployment.

Equipped with portable computers, students at Neodesha High School in Neodesha, Kansas, use wireless network services to explore electronic educational resources at the Louvre, Smithsonian, and United Nations from any point on campus (*http://www.digitalocean.com/*). Wireless network implementation in schools in Hillsborough County, Florida, enables instructors to incorporate Web-based material into the curriculum and enables students to contribute to the development of a statewide environmental database. Wireless network technology used by the public school system Independence, Missouri, facilitates cost-effective Internet access and allows faculty, administrators, and students to share information between 22 schools and three administration buildings in a district-wide configuration (*http://indep.k12.mo.us/*). These examples show how wireless networks can promote educational enrichment.

Distinguished by their capacity for augmenting the functions of existing land-based networks, wireless networks support flexible connectivity to computing resources regardless of the user's location or mobility. Technical advances in portable devices and the demand for instantaneous information access are contributing to the development of wireless configurations in the educational environment.

Wireless networks convey information as electromagnetic signals from transmitter to receiver, thereby eliminating the need for a fixed wire-based connection. Information transfer is accomplished with such communications options as infrared, spread spectrum, microwave, packet radio, cellular, and satellite technologies. Like their wired counterparts, wireless networks feature a multiplicity of network architectures, operate at various rates and levels of complexity, and vary in size and capacity from WLANs (wireless local-area networks) to WWANs (wireless wide-area networks).

A WLAN is a communications network capable of supporting interconnectivity of an array of data-communicating devices within a single building or group of buildings in a confined geographical location, such as on a university campus. A WLAN implementation in the educational environment accommodates the computing requirements of increased student enrollments without new construction and supports extension of wire-based network services to classrooms, libraries, cafeterias, student centers, and dormitories. Faculty using notebook computers equipped with wireless capabilities can access the land-based network infrastructure to update course material and grade reports; perform database queries; review student records; schedule conferences; upload and download files; and exchange e-mail with colleagues, students, and administrators from locations that may not permit a wired network infrastructure. In the broader environment, WWANs facilitate information access across municipalities and national boundaries. With the wireless device functioning as if it were attached directly to the wired network, the geographic separation between remote users and the network resources is transparent.

Wireless networks provide remote access to computing resources at any time and create new options for bringing mission critical and leading edge applications to remote learners. Wireless capabilities for enabling multimedia instruction are under investigation in the InfoPad project at the University of California at Berkeley. The Wireless Information Network Laboratory (WINLAB) at Rutgers University is designing next generation communicators that merge mobile comput-

ing devices, portable phones, and pagers for wireless access to voice and nonvoice services. According to Akyol and Cox (1996), expectations are that future wireless users will carry hand-held computers equipped with videoconferencing and audio capabilities that support high-speed data communications at rates of 10 Mbps (megabits per second) and higher.

Despite this potential, debate persists in academic circles about the feasibility of incorporating wireless technology into the fixed-campus-network infrastructure. An analysis of my case study research indicates various concerns among decision makers evaluating the merits of wireless implementation. Potential hurdles include transmission reliability, health and security concerns, costs, and lack of standards. Wireless technology traces its origin to 1897 when Guglielmo Marconi demonstrated the use of radio for maintaining contact with ships at sea. Yet, wireless network deployment in educational settings is a relatively recent phenomenon. Documentation on its effectiveness in the learning environment is limited.

Questions that are integral to any consideration of whether to use wireless technology as a networking option for accommodating institutional requirements include the following:

- What are the fundamental characteristics of wireless technology?
- How are wireless networks currently used? What are projected services?
- Can wireless networks serve as a framework for emerging applications?
- What are key advantages and disadvantages associated with wireless implementation?

This article addresses these questions, examines the capabilities of wireless technology, and presents approaches for implementation of a wireless network in the educational environment.

Wireless Fundamentals

Wireless implementation involves selection of hardware, software, and communications technologies to resolve problems, optimize productivity, and meet strategic objectives. Wireless solutions differ in terms of expense, geographical coverage, licensing stipulations, and interoperability. There are multiple approaches for accommodating networking requirements.

Infrared and spread spectrum commonly provide connectivity for a WLAN configuration. Because infrared signals cannot pass through walls, floors, or room partitions, this technology works best indoors for applications found, for instance, in medium-sized administrative offices. Operating in unlicensed ISM (Industry, Scientific, and Medical) radio frequency bands, spread spectrum is primarily used in larger LAN applications that span multiple workgroups and buildings. This technology supports transmission rates up to 10 Mbps (megabits per second) and a maximum range of 800 feet (Muller, 1995).

Various alternatives are available for developing WWANs. Advanced Radio Data Information Service (ARDIS) and RAM Mobile Data (RMD) networks offer two-way wireless packet data services in metropolitan areas nationwide using dedicated networks with data rates from 4.8 Kbps (kilobits per second) to 19.2 Kbps. Designed for expediting seamless nationwide interoperability, CDPD (Cellular Digital Packet Data), a cellular digital overlay network facilitating data transmission at 19.2 Kbps, offers connectivity to the Internet with performance similar to a dial-up PPP (Point to Point Protocol) connection.

Capable of handling video, data, and voice for personal communications services, microwave is a popular technology for bridging isolated LANs. FCC (Federal Communications Commission) licensing is required for microwave transmission. Satellites employ microwave technology at very high frequencies for wide-area interactive communications and delivery of broadcast services to remote locations that cannot be served by land-based facilities.

Wireless technologies are evolving. Standards for wireless communications are in development. Organizations active in this arena include the ITU (International Telecommunications Union), IEEE (Institute of Electrical and Electronics Engineers), and ETSI (European Telecommunications Standards Institute).

Wireless Networks in Action

The format of a wireless implementation depends on institutional requirements. Wireless LAN connections work well for situations in which wiring is too costly or impractical, such as in older buildings or historical structures. A WLAN also serves as an effective backup for crisis management in case of campus disasters from fire, flood, hurricanes, or earthquakes. A wireless link

for point-to-point network expansion enables mobile users indoors or outdoors to access a LAN in the same way they would if they were using standard LAN cabling. Mobile users dialing into a wired LAN can have the network route their query to a destination that might be in another location or another country so that they do not have to pay long-distance telephone charges. Dale Foster (personal communication, February 29, 1996), head of Library Special Collections at Auburn University, noted that in terms of library applications a WLAN can facilitate such on-site technical and reference services as catalog inventory, serials maintenance, and online database searching.

A wire-free link using microwave transmission of data can bridge two network segments separated by open spaces or highways, provide immediate access for temporary or new users, and reduce costs associated with cabling and equipment installation. Peter Spyers-Duran (personal communication, February 28, 1996), dean of libraries and professor emeritus at Wayne State University, indicated that this approach is used at Wayne State for interconnecting networks at the medical school and medical library. Nick Long (personal communication, February 27, 1996), EarthVision Project coordinator at Michigan's Saginaw Valley State University (SVSU), noted that a microwave solution enables communications between two campus sites at SVSU as well. According to Long, SVSU also established a microwave link to a local high school so that teachers and students conducting environmental research could explore the Internet using the SVSU gateway. This particular project was discontinued when new structures interfered with the line-of-sight required for microwave transmission.

According to Hills and Johnson (1996), the Wireless Andrew Project at Carnegie Mellon University features a high bandwidth WLAN built with WaveLAN™ that supports campus connections at 2 Mbps for library and Internet access. The infrastructure facilitates interoperability to a low bandwidth WWAN operating at 19.2 Kbps in the Pittsburgh area as well. This WWAN uses CDPD technology.

Paul Flanagan (personal communication, April 12, 1996), professor at National Defense University (NDU), related that a wireless LAN, also based on WaveLAN technology, extends the capabilities of NDU's wired LAN so that faculty and students using notebook computers with wireless modems can access coursework, data files, e-mail, and document printing capabilities from their classrooms. Flanagan further noted that WLANs are used by faculty off site for conducting group decision support demonstrations:

> Instructors can readily set up and break down wireless LANs as needed. The technology performs relatively well in temporary instructional situations. There is a little bit of denigration in service with the wireless LAN in the field in comparison to the wired LAN, but, nonetheless, the information flow is impressive.

Since June, 1995, Metricom has made Ricochet, a microcellular wireless data service, available to postsecondary institutions. Creation of a packet network wireless infrastructure with Ricochet involves installation of a series of radio transmitters and receivers on tops of buildings and poles on a college or university campus. Wireless data packets are transmitted at a raw data rate of 100 Kbps. However, because bandwidth is shared, actual throughput ranges from 10 Kbps to 40 Kbps. To implement the service, a user connects a radio modem that resembles a regular external modem to a laptop running PPP protocol. Metricom's provision of infrastructure installation and reasonable monthly rates has resulted in the deployment of its wireless configurations at many institutions, including Austin College, California Polytechnic State University, Oregon State University, the University of California at Berkeley, and the University of Miami.

Bob Clover (personal communication, February 27, 1996), director of instructional applications and user services at California Polytechnic State University, indicated that, although wireless access using Ricochet is available, administrators are not currently actively encouraging the service. Dan Malone (personal communication, February 26, 1996), network administrator at California Polytechnic State University, noted: "Wireless use has not yet exploded on our campus. We are trying the system out to see how it works."

According to John Dolan (personal communication, March 1, 1996), network applications specialist at Oregon State University, Ricochet has been in place since the summer of 1995. Dolan commented:

> Like everyone else we got caught with demand for Internet access. We had a limited number of phone lines and our modem pool was unable to accommodate user access requirements. ...Wireless is a good augmentation to network services especially in terms of providing network connectivity to students and faculty with laptops.

He also noted that the "wireless network performs better than some engineers were trying to condition us to believe and a bit worse than some sales people advised us."

At the University of California—Berkeley, transmission from a user's portable computer is routed through the Metricom network to a gateway linked to the land-based campus network. The price of a wireless modem for educational use is $199. Metricom charges a flat monthly rate depending on the speed of the data over the network. Initial monthly fees per user for testing Metricom capabilities are $19.95.

Al Essa (personal communication, March 2, 1996), director of information technology at Austin College, said: "A major reason for using a wireless solution provided by Metricom is that no capital investments for the infrastructure were required." As Essa notes: "Wireless is a good solution for providing connectivity from buildings where no cabling is installed. The technology is promising but it is not a replacement for a wired network."

Advantages and Limitations

Wireless networks offer enhanced functionality by supporting fast and easy access to wire-based networks from outdoors, study carrels in libraries, and dormitories. These networks can be set up temporarily for in-building applications in classrooms and workshop facilities where group meetings take place. Jeffrey Price (personal communication, March 1, 1996), telecommunications project manager at the University of Miami, noted that a wireless infrastructure installed by Metricom at his university allows users to access computing services from faculty apartments, student housing, and other campus buildings where optical fiber has not yet been put into place or where wiring is inadequate. Price said: "Although we are only in the start-up phase, we are very pleased with the outcomes."

Essa (personal communication, March 2, 1996) related:

> At Austin College, our wireless system makes possible Internet services for faculty, students, and staff on campus. We also provide a wireless link enabling youngsters and their teachers in a nearby elementary school to access the Internet from campus facilities.

According to Essa, the wireless system is easy to use, requires very little technical expertise, and works well in a variety of operating environments. Essa said: "Technically our wireless installation has been flawless. Our system has never been down except for occasional maintenance handled remotely through Metricom's network operation center in Houston." Essa added: "We used wireless initially to provide coverage for users in campus buildings without wired connections." Future projects include extending wireless connections to local libraries and community groups.

Essa (personal communication, March 2, 1996) also pointed out that a major disadvantages of a wireless connection is its current speed. He said: "We get pretty good performance at 14.4 Kbps and 28.8 Kbps, but that is just not adequate for a LAN environment providing direct connections to the Internet." Researchers at Johns Hopkins University's Welch Medical Library found that the performance of wireless technology for copying and accessing basic files was inferior to that associated with wired AppleTalk or Ethernet networks (Strom, 1995).

Wired networks are generally more economical, faster, more secure, and more reliable than wireless counterparts. Stephen Lopez (personal communication, April 10, 1996), director of network and telecommunications services for the National Board of Medical Examiners, noted: "Our organization will look at wireless down the road. Wireless [technology] is not quite ready for prime time. The signaling to the desktop is still sluggish."

Wireless LANs have considerably less throughput than wired ATM (Asynchronous Transfer Mode) LANs that operate at multi-megabit rates. Steven Zink (personal communication, April 9, 1996), associate vice president for information resources and technology at the University of Nevada at Reno, observed that wireless technology is a good solution for providing

computing services in university buildings with an asbestos hazard, although the technology is restricted in terms of bandwidth and applications supported. Zink added: "I think the future may well be wireless, but we are not willing to be on the bleeding edge."

Mobile devices are subject to limitations in terms of size, weight, power consumption, and support for high-performance applications. Operational conflicts can occur with wireless network interface cards (NICs), computing equipment, and software packages. The quality of wireless communications services and signal strength can vary widely. Don Sadler (personal communication, May 1, 1996), director of operations for the city schools in Huntsville, Alabama, noted that impairments in data transmission caused by weather conditions and new building construction, equipment costs, and FCC licensing delays led to the school system's decision to replace the existing microwave network with an ISDN (Integrated Services Digital Network) solution.

Without proper safeguards, wireless transmissions can be intercepted. Flanagan (personal communication, April 12, 1996), noted that "at the outset, the major concern with wireless implementation at the National Defense University was security. Upon further evaluation, we decided that risks associated with our wireless LAN were not any greater than risks associated with our wired LAN." Passwords, firewalls, smart cards, biometrics, and encryption are among mechanisms that can be used to safeguard information integrity and ensure data confidentiality in wireless and wired network environments (Littman, 1995). Techniques for protecting mobile devices from theft must be put in place as well.

Planning Strategies

Wireless computing involves providing individuals with a rich set of computer communications capabilities in an integrated and easy-to-use format as they move from place to place. Bob Dixon (personal communication, March 2, 1996), director of the Advanced Technologies Group for University Technology Services at Ohio State University, noted that wireless technology is used at his university by campus architects for monitoring buildings. Plans are underway to create a campus-wide wireless infrastructure as well. According to Dixon: "A wireless LAN can never replace a wired network. Yet, it provides a wonderful capability. As educators, we should be aware of this option and its many practical applications."

Design decisions for building wireless networks in the educational environment are challenging. Modems range from built-in and stand-alone units to removable PC (also known as PCMCIA) cards. Portable devices include notebooks, laptops, wearable computers, and pen-based personal digital assistants (PDAs). In evaluating the suitability of wireless communications for the learning environment, the need for wireless technology and its priority in relation to other computer communications requirements should be addressed initially. Key questions that can contribute to an understanding of the feasibility of wireless implementation and its capabilities, benefits, and shortcomings include the following:

- What hardware and software configuration can effectively serve as the foundation for the wireless infrastructure?
- Will the wireless network be confined to the campus or extend into a wider environment? Is provider service available in locations requiring connectivity?
- What traffic and access patterns must be accommodated? Is FCC licensing required?
- What levels of network and application performance are acceptable?
- What procedures can facilitate integration of fixed land-based and wireless networks?
- How can current applications be adapted to the requirements of wireless computing to promote accessibility to the mobile user when needed?

Health and safety concerns associated with wireless use are important factors that also must be assessed. John Scigliano (personal communication, March 13, 1996), professor at Nova Southeastern University, noted that fear of exposure to radiation associated with wireless computing can be a deterrent to wireless deployment in the campus setting. Decision makers investigating the incorporation of wireless services into the educational environment should proactively ask vendors what features are in use to ensure the safe and reliable operation of their equipment.

A feasibility study can establish with greater accuracy the likely success of wireless deployment. Ques-

tions that can assist in conducting the feasibility study include the following:

- What are the total estimated costs for wireless deployment? What is the breakdown between subscriber and network costs? Is the cost-benefit relationship associated with wireless deployment strong enough to warrant funding?
- Are expectations concerning wireless benefits reasonable?
- Can the wireless paradigm facilitate interoperability across diverse computing platforms?
- Are wireless products from different vendors compatible?
- What are the estimated levels of throughput with the wireless network? Will the wireless network operate faster on campus than off campus? If so, is there software available that will allow the entire system to adjust automatically to accommodate the bandwidth change?
- Can the technology satisfy institutional bandwidth requirements?
- What are the spatial considerations for wireless network implementation?
- Can the system work well in densely populated urban areas and in locations adjacent to heavily traveled highways and airports?
- Can the system function in rural areas with mountains nearby?
- Is the wireless network flexible enough to accommodate current and emerging applications and services?
- Can the wireless environment promote curricular enrichment and innovation?
- What kinds of security devices and safety mechanisms are in use?
- Are there health risks associated with wireless deployment?

Applications selected for implementation should accommodate user requirements and justify the expense of wireless investment. Guidelines for connectivity, integration with the fixed network infrastructure, acceptable performance levels, user training, information security, and monitoring and managing the wireless implementation under various conditions should be clearly defined to facilitate migration to the wireless computing paradigm. If the decision is made to go forward with wireless deployment, a timetable for wireless installation should be established. Wireless solutions can be developed in house or by establishing partnership alliances with communications providers. Capabilities of the wireless configuration should be carefully evaluated in pilot tests prior to its full-scale implementation.

Conclusion

Advances in wireless communications enable mobile users to access networks transparently at anytime from anywhere through the use of such portable devices as high-performance laptop and palmtop computers equipped with wireless capabilities. Successful implementation of wireless networks in the educational environment enhances information access, instructional activities, and administrative services. Wireless networks can effectively serve as augmentations and extensions of wired networks and work well in temporary situations. An understanding of wireless communications is critical in addressing challenges associated with the practical design and implementation of wireless networks for educational use.

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Muller, N. J. (1995). *Wireless data networking*. Boston: Artech House.

Strom, D. (1995). Wireless links prove worse than a card catalog for giving a reliable connection. *InfoWorld*, 17(14), 60.

Resources

ARDIS, 800/662-5328; Web: http://www.ardis.com/ardis_hp/website2.htm/.

CDPD, Web: http://www.cdpd.org/.

ETSI, Route de Lucioles, F-06921, Sophia Antipolis, CEDEX, France; +33 4 92 94 42 00; Web: http://www.etsi.fr/.

IEEE, 445 Hoes Lane, PO Box 459, Piscataway, NJ 08855-0459; 800/678-IEEE; fax 908/981-0225; Web: http://www.ieee.org/.

InfoPad Research Project, Web: http://infopad.EECS.Berkeley.edu/.

ITU, Web: http://www.itu.ch/.

Ricochet information is available from Metricom, Inc., 980 University Avenue, Los Gatos, CA 95030; 800/556-6123 or 888/4NO-WIRES; info@ricochet.net; Web: http://www.ricochet.net/. The pilot study was conducted at the University of California—Berkeley. For more information access the UC—Berkeley Data Communication and Network Services Web page at http://ack.berkeley.edu/dcns/modems/metricom/.

WaveLAN products are available from Lucent Technologies Commercial Sales, PO Box 19901, Indianapolis, IN 46219; 800/432-6600; Web: http://www.wavelan.com/.

WINLAB, Rutgers, The State University of New Jersey, PO Box 909, Piscataway, NJ 08855-0909; 908/445-0283; Web: http://winwww.rutgers.edu/.

Wireless Andrew Project, Information Networking Institutes, AD20 Hamburg Hall, 5000 Forbes Avenue, Pittsburgh, PA 15213; 412/268-7195; ini-director+@andrew.cmu.edu; Web: http://www.ini.cmu.edu:80/WIRELESS/.

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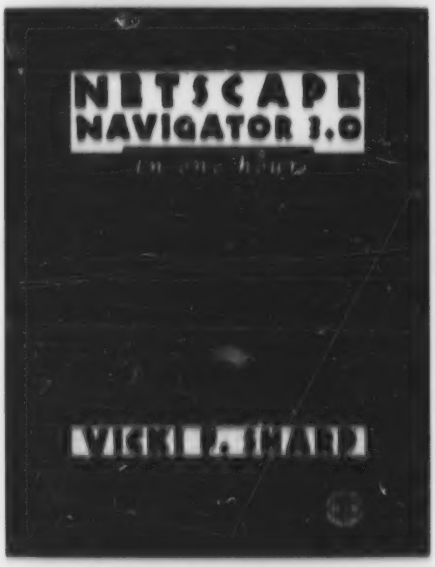

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Music, Technology, and Textual Presence

by David Beckstead

Recent advances in music technology have created a variety of challenges and opportunities for the music classroom, most notably in the area of composition. John Cage (1961) pointed out that the dominance of conventional notation in Western music has unjustly elevated composers above other musicians, and that the mode of transmission and preservation of music—the score—has confined access to composing music to a few people. The ramifications of the Western mindset have left composition as an elite and often obscure branch of music education despite the efforts by educators such as R. Murray Schafer (1985), Bennett Reimer (1989), and John Paynter (1991), all of whom have urged a rethinking of this view.

With the advent of MIDI (musical instrument digital interface), digital synthesis, and computer sequencing, young musicians can now record, play back, edit, and transpose music and create a score from music inputted on the synthesizer. As MIDI data is easily translatable into Western notation, traditionalists can still focus on the note and the score as the prime vehicle for composition. And given the vast pallet of sounds, freer experimentation with timbre, rhythms, and sounds is easier than ever.

The resulting file from such MIDI explorations provides some possibilities itself. Although digital sampling (i.e., CDs) requires huge amounts of storage space, a MIDI file is merely a set of binary instructions that controls a MIDI device (e.g., a synthesizer). Song files are thus small and easily transferable to any MIDI system (for a complete discussion of this topic see Beckstead, 1995).

Composers In Electronic Residence (CIER) is a program that takes of advantage of these recent advances to put musician/composers in touch with young student composers so that they can share music and ideas. The program was developed using the WIER (Writers In Electronic Residence) model that connects students working on original writing in their classrooms with published authors (see Owen, 1996). The challenge for CIER was to find a format that could handle not only the textual exchange (as in WIER) but also handle the exchange of music in the form of MIDI files. In 1991, when experiments began for CIER, this exchange proved to be a daunting task. Files had to be encoded, sent as text and then decoded, all in a one-to-one e-mail environment. Last year CIER, following WIER's lead, moved to the FirstClass conference site at York University in Toronto. The system, which is intuitive and user friendly, allows file attachments. Student composers could now post a message in the conference stating a bit about themselves and their music, and attach the music, in the form of a MIDI file, to that note. Composers, students, and teachers could all read the message; download the MIDI file; and respond with text, and, if they chose, an altered MIDI file demonstrating the discussed ideas. Such immediacy proved to be a strong point in CIER—the exchange of not only textual ideas but also musical ideas.

Composers In Electronic Residence is a nonprofit, teacher-run electronic community. Operating costs for the first two sessions have been provided by a contract for service from Canada's SchoolNet (*http://www.schoolnet.ca*). Further information and musical examples from CIER can be found at its Web site (*http://www.edu.yorku.ca/ciermain.html*).

The first session of CIER on the FirstClass conferencing system took place between January and June of 1996, with the following five schools and three composers involved:

- American School In Japan (ASIJ), Brent Huber, teacher.
- Thomas Haney Secondary (Canada), Ed Dumas, teacher.
- River Oaks School (Canada), Brian Alger, teacher.
- Kaukauna Area Schools (USA), Wayne Slowinski, teacher.
- Patch American High School (Germany), Marcia Dawson, teacher.
- Gary Barwin, composer.
- Dave Beckstead, composer.
- Maud Hickey, composer.

This article presents what occurred during that session with respect to the perspectives of the CIER participants. If our only data were the music exchanges, this might be a difficult proposition. After all, the exchanges in the conference were concerned with the compositions of the students and not necessarily the thoughts and perceptions of the participants. However, there was more to this first session than just the discussion concerning the student works. A separate forum was also created for technological concerns, such as how to use the conference and, in a broader sense, discuss technology in the music classroom. The forum quickly turned to intense philosophical discussion concerning such topics as the role of the "human" in MIDI composition, quantization, and textual presence. Thus, this forum became quite reflective and the concerns and perceptions that the teachers held became evident through some of these exchanges. In addition, teachers and composers were encouraged to submit reports (or musings) concerning their thoughts and perceptions of CIER at the end of the first session. As well, participating students were asked to fill in a brief questionnaire. I consider the following four areas for this article.

1. Student composition forum.
2. Instructor's forum.
3. Student questionnaires.
4. Teacher and composer reports.

To return to the original issue, I believe it is possible to present "what went on" in CIER through a lens informed as much by the participants as by my own experiences with CIER, both as its creator and as one of the resident composers. What follows is an attempt at that presentation. I will take the liberty of first reviewing the data in the Student Composition Forum in a less subjective and quantitative fashion to provide a context for considering the reflective data from the other three sources.

The Student Composition Forum

There were 79 messages (17,771 words) posted in total, constituting 14 discussion groups that contained 18 original student compositions. By discussion group I refer to the original posted MIDI file and the subsequent responses or discussions pertaining to that piece(s) of music. On average, each discussion group contained 6 to 7 messages, with the smallest group generating a single message (the original piece of music) and the largest containing 13 messages.

The participation distribution by school was as follows:

- Patch: 7 discussion groups.
- River Oaks: 3 discussion groups.
- Kaukauna: 2 discussion groups.
- Thomas Haney: 1 discussion group.
- ASIJ: 1 discussion group.

Although neither Thomas Haney nor ASIJ were involved, per se, with the music conference, the teachers from these schools monitored the proceedings of the other music discussions. Both Brent (at ASIJ) and Ed (at Thomas Haney) also contributed to the technical discussions outside the music conference and offered final reports.

Musical Intent

When students posted pieces of music for discussion, each piece of music appeared as a file attachment on a message. The text of the message would often state a bit about the music, who composed it, and what their reasons for posting it were. The following message excerpt is an example from Jessi at Patch:

> This short piece is the product of about a month and a million changes. It was written in a Computer Music course here at school, and I am looking for suggestions on how to make it longer, or add tracks. Thanks for listening!

From the 14 discussion groups, three areas of intent emerged:

1. Works in progress whose composers were seeking advice, revision, and so on (11 groups).
2. Finished works posted for sharing (2 groups).
3. MIDI chain letter (1 group).

The participants' intent of using CIER as a vehicle for discussing and subsequently revising work is evident, because most groups fall into this category. Group 3 was a type of MIDI chain letter. The students at River Oaks supplied an initial idea posted it, with the intent of creating a connective composition to which all participants would contribute. Finished works (Group 2) were posted from students at ASIJ and Erica at Patch. She stated in the initial posting, "I feel this is a finished

composition, but I thought I would post it as an example of how lyrics can help lead a person in composing a work." Messages such as these were important in clarifying students' intents for their music. As well, the extra information supplied by the student composers helped the composers form a more coherent and appropriate response.

Musical Content

A variety of styles, influences, and interests were evident in the 18 student compositions posted. Abilities ranged from beginners in Grade 7 to senior high school students planning to go on to postsecondary studies in music. Similarities did exist in contributions from within a school, as in the case of River Oaks and Kaukauna. The River Oaks compositions were created as part of a multimedia project. In all, 6 separate pieces were posted, all relating to an interactive story design. Students from River Oaks explained one of the postings:

> These two pieces were composed by Veneshia and Tamara for the DreamQuest Project. DreamQuest is a nonlinear, interactive story design we are creating in SuperCard 2.5 software. There are five quests in the project. These two pieces are the opening themes for two quests. Each theme can only be approximately 30 seconds as it is designed to accompany graphics and text display as well.

Kaukauna students were involved in more structured composition projects based on feelings and ABA form. Marie and Amber explained in their posting:

> Hi, we are Marie and Amber, seventh graders from Electa Quinney Middle School in Kaukauna, Wisconsin. This is our first composition and we tried to show the feelings of confusion and excitement. To show confusion, we used notes that were long and wavy, and to show excitement we used short fast notes. We used ternary form to organize our composition. We hope you like it.

Students at the third school, Patch, who created the majority of the discussion groups, represented a less-structured approach to composition. In this upper level course, students seemed free to pursue their own ideas and genres. Contributions from Patch ranged from introductions to heavy metal tunes, from European Canonic forms to American Rag Time piano.

Responses Within the Discussion Groups

The majority of the responses were from composers. All discussion groups (except one) received at least two responses from different composers and, in 11 of the discussion groups, MIDI files demonstrating the discussed ideas were included with the responses. Of the 63 responses, 43 were from the composers (65%). Of the remaining responses, 15 were from the student composers responding to the discussions about their pieces, and five represent responses from other students and teachers.

On further examination of the discussion groups, one can find that the number of messages/responses in a group seems to depend on whether or not the student(s) who posted the original piece of music join in the discussion (i.e., responding to the responses). If no further communication from the student who posts a MIDI file occurs within a discussion group, the average number of responses is three (in seven discussion groups). When students do respond to the discussion, the average goes up to just more than seven. Clearly students can foster further discussion by joining in the exchanges about their work.

Having students respond to the discussion of their work is a notion that was encouraged at the beginning of the CIER session and further reinforced by responses from composers and other schools. In many cases, responses directed at student works ended with an invitation to join the discussion. Some examples:

> *Maud (to River Oaks)*: Give me some feedback on what you think of my changes.

> *Dave (to Brian from Patch)*: Please write back and tell me your thoughts on this ...

> *Gary (to Jessi from Patch)*: Let's hear more!

The question remains of whether it is desirable to foster as much discussion as possible. Is a successful discussion group one that includes many responses, including contributions from the original student composer? Acting in the role of composer, I know that I feel some-

what disappointed if I spend a lot of time on a long textual and music response which the student does not acknowledge, question, or challenge. I will look into this area further when examining other areas of the data. Much was written in the final teacher reports concern the advice/comments in the discussion groups.

The Instructor's Forum

A total of 68 messages were posted in the instructor's forum, the largest amount coming from, not surprisingly, myself, acting as administrator. The following comment illustrates the general feeling about this forum.

> *Wayne*: The instructors forum was a great vehicle for discussion of theoretical, ethical, and philosophical considerations regarding the use of technology to facilitate student learning.

As stated previously, I have called this area the instructor's forum, but I should point out that the forum was not a type of virtual staff lounge in which students were not allowed. Students did have access to this part of the conference but chose not to join in the discussion, even after I prompted them to do so.

The messages posted in the instructor's forum appear to be concerned with two themes—the practical (43 messages) and the ethical (25 messages). The practical messages were prominent early in the conference when the instructor's forum was used as an inservice area. Participants could download messages outlining how the FirstClass conferencing system worked and practice uploading and downloading MIDI files. As the conference progressed, participants posted messages if they were having some technical problems with their equipment, Internet connection, or FirstClass. For example, Ed at Thomas Haney was having problems getting his Korg synthesizer to work with the sequencer. I posted a note asking if anyone knew the synthesizer and Marcia responded with instructions on how to get it to work. As far as I know, the problem was solved although Ed never responded either way to that part of the discussion.

The second division I perceive, "ethical," arose as the music conference was underway. Gary initiated a discussion concerning the performance of computer music and the role of the "human." The discussion went on for two months with all teachers and composers contributing their ideas and thoughts. Splinter groups arose and more specific areas were discussed in smaller groups. In one case, Gary and Brian discussed the imposition of the "tool" on the craft over four messages (of a page or more each). These ideas and themes will be considered more specifically in the Teacher and Composer Final Reports section.

Student Questionnaires

A student questionnaire, designed by Maud, was left in the instructor's forum area. Teachers were informed that they could download it and administer it to their students on a voluntary basis. Both Marcia and Brian had their CIER students fill out the questionnaire. This gave us a total of seven completed forms.

Much of the questionnaire was concerned with the discussion of the pieces—feedback, revision, were suggestions helpful, and so on. Again we see the importance of the feedback in CIER and its utilization manifested in Maud's questionnaire. Copies of these completed questionnaires were posted by the teachers in the conference. All but one of the students found the composers' advice "helpful" and the other found the advice "more interesting than useful." All of the students spoke of the "interaction," "communication," and advice as being the most worthwhile aspects of CIER, further verifying the primacy of communication in the CIER community.

Five of the seven students did not offer any suggestions for changes, saying they liked it as it was. One student mentioned that she would like to see more student-to-student response. Indeed, of the 68 responses, only 4 were from students commenting on other students' work. Interestingly one student mentioned that he would like to see face-to-face meetings with the composers on the Internet, while another mentioned that these types of meetings are "more trouble than they are worth." Both students were from Patch and had experienced this type of meeting using the CU-SeeMe software.

Teacher and Composer Final Reports

Teachers and composers were asked to submit their thoughts and perceptions of the CIER experience in the form of a written report. Reports were received by e-mail and posted in the message conference. Seven were received—one from each of the teach-

C1

ers at the five participating schools and one from each of the two composers. Responses averaged slightly longer than four typed pages, or 1730 words. After reviewing all the reports, I have identified four main themes or issues that occur throughout. They are as follows:

1. Advice and comments.
2. Conferencing technology.
3. Composing technology.
4. Participation.

I acknowledge my own imposition in putting these ideas together, but I have tried to remain as faithful as possible to the original texts and intended meanings (as far as that is possible).

Advice/Comments

The issue of the advice or responses in the reports was a prominent area of discussion. All five teachers noted the efficacy of the thoughtful commentary on their students' work. Besides the legitimizing factor involved in asking students to discuss their compositions with composers, many spoke of the educational or pedagogical nature of the advice from the composers.

> *Brian*: In having the opportunity to share their work with a larger audience, including fellow students and professional composers, the general attitude toward their work changed in that they became more analytical in their thinking about what they were doing. Upon receiving feedback from ... composers, [the students'] understanding about music grew by becoming directly involved with different perspectives. This is a very powerful effect since it serves to enhance their understanding of their work in a manner not possible without CIER.

> *Marcia*: One of the major strengths of CIER was the interaction of teachers, students, composers, collaborators (whatever title we wish to give our roles). For me it provided validation for what I was teaching. You know how sometimes you feel you're talking but no ones receiving? It was fun to have a student come and say, "Look, this is just what we were talking about yesterday!" It was also a way to get that help you need when you are at a loss as to how to help a student over that "musical hurdle." It seemed that we always received suggestions when we needed them most!

> *Brian*: In a sense, the response became the core for a lesson and the extension of musical concepts in question.

> *Brent*: You (CIER) have really focused on the educational aspects of composition and co-composition.

Maud spoke more specifically of the educational nature of the advice from composers, noting the contextual aspects when students learn about music by working with their own material:

> Rather than drilling hard, dry, and trivial facts about theory and history, these composers were using the theory language and talking about music history in their dialogues with the students about their compositions. One example is the April 1 Dave Beckstead correspondence to Drew Schwinn where he points out the "minor 2nd" in the musical "ostinato" that he created. I also recall Gary talking to one composer about his music which was medieval sounding, and he then mentioned some recordings for this student to check out in order to hear the similarities. This is so much more meaningful for students than the trivial pursuit games we play with them in typical music history/theory courses!

Gary read all the reports before responding (this was the last one posted) and thus was in a position to reflect both on his experiences and the views of others. He sensed the importance being placed on the educational aspects of the exchanges and had a slightly different take, one that he sees outside the realm of typical teacher or educational thinking.

> As a "composer" (i.e., noneducator) my experience was perhaps the opposite of Maud's. I had to emphasize pedagogy, that is not to just think like a composer but as a teacher who had a knowledge of composition (maybe like I imagine you (Dave) & Maud think). My composer impulses may have had been plunging right in to the music and tearing it apart, totally rethinking it, suggesting it head off in all sorts of different ways. It's all

very well suggesting that they change their chorus-verse pop song structure into some convoluted micro-polyphonic homage to Ligeti but, that's obviously only useful if they are even vaguely interested in the idea, if they can respond on some level to the idea and that kind of music.

I think Gary sees much potential for CIER to exist beyond the educational aspects as exemplified by comments from the other participants. His position to comment is informed by the fact that he is the only member operating outside the educational establishment—he is neither a teacher, nor trained as one. All his experience is with his art, that of music composition. And this special perspective of the artist is often the most desirable in terms of the notion and efficacy of a Composer in Residence situation. Gary elaborates further:

> I was aware of always trying to appeal to the students musically, not just educationally (do this because it is good & it is good for you). ... I feel it is part of my role as a composer (as opposed to that of the teachers, who are well able to teach the standard stuff) to offer not just ideas as to how to finish a piece "professionally" but to offer wild ideas, inspiration, to expand the horizons of the students. A composer in residence isn't just there, I feel, to be a teacher with more musical training/experience (with correspondingly less pedagogical training/experience!) but to give the students a chance to interact with a working artist. To hear about what inspires that artist, what they think is cool and exciting, to hear what crazy ideas they might come up with (as opposed to the—supposedly—institutionally approved ideas of the teachers).

Overall, Gary felt his presence as a composer was not utilized to its full extent and he gives a few recommendations for how this can be remedied. Perhaps he felt a little overwhelmed by the large "educational" presence and assumed more of a teacher role in his interactions with the student composers, concerning his responses with the "standard stuff."

Conferencing Technology

Although many of the CIER schools found themselves experimenting with teleconferencing for the first time, Marcia and her students at Patch had long been involved in these types of projects, and in a variety of formats. Her notions then, of the efficacy of the conferencing medium of CIER, that of FirstClass, seem especially poignant. Over the years I, too, have been involved in a number of these projects, and although the premise is always a worthwhile one—exchanging both music and ideas about music—all too often, the format of the exchanges would prove to be the defining factor in the success of the program. Simple e-mail exchanges are hard to keep track of, and in a conference the size of CIER (we had more than 150 messages in the first session), even a listserv format would be a daunting format because of the sheer volume. The FirstClass system archives all messages in a logical and intuitive framework and, more importantly, is easy to use. The organization of the forum allowed for multiple areas of discussion so that exchanges concerning music could be kept separate from technical discussion or queries.

> *Marcia*: You may note in Brian's questionnaire that he refers to the video teleconferencing projects as fun but not as productive as CIER. It was interesting to watch the various students react to the different methods and/or problems encountered with CIER and with CU-SeeMe conferencing. I'm certain that part of this falls back to learning styles and response to feedback. A couple of the kids liked seeing who they were working with and being able to converse and "hash-out" the problems or changes being suggested. Others liked to open their CIER account, read through their "mail," try out the suggestions and then report back to the group. I think this says a lot for the manner in which CIER was organized. I didn't have any students who reached a frustration level or felt pressured with CIER but it did seem to raise its "ugly head" when they were live.

None of the CIER participants had problems learning and using the system, even though most had never used the system before. As well, FirstClass provides an easy file attachment function, so that MIDI files were easily downloadable and did not have to be encoded as text (as is the case for some e-mail and listserv exchanges). As Brian stated:

> I believe CIER to be an exemplary use of telecom[munication] tools. ... The CIER infrastructure was solid and consistent. From our point of view, we were able to overcome the dreaded developing software literacy stage quickly and efficiently. This helps to make the technology transparent, and rather than the person being the tool, the computer becomes the tool.

Still, making the technology transparent does not guarantee that the tool will have no influence in shaping the experience. If it did, one could assume that a Composer In Residence situation would not be dissimilar to the Composer in Electronic Residence situation. Clearly this is not the case; for proof of this assertion, one need look no farther than the exchanges themselves. Distance, mediated, textual exchanges are very different from face-to-face ones. In the electronic residence, the physical presence is replaced by a textual one. I must preface the presentation of this part of the data with the caveat that it was very much instigated by me. Although I tried to encourage open-ended reports—a kind of stream-of-consciousness musing—I did respond to reports from Gary, Brian, and Marcia that touched on the subject briefly, attempting to foster further discussion on a topic of interest to me.

Some teachers and composers felt that the textual nature of the conference did in fact marginalize the "knowing" of who is at the other end and felt that CIER would benefit from providing biographical or pictorial information on members. Maud responded to one of my probes with:

> I believe in our situation—which is to offer the best advice that we can to the student composers—it is most helpful to know WHO or WHAT they are writing for. I even wish I knew the composers more—I want to be able to imagine the person and his/her background with every composition.

Marcia responds to Maud:

> I have found in a couple of the other projects we have done here at Patch that knowing who was at the other end of the line was really fun! It made you feel like there was really a person and not a square screen responding to you. We have many classes being taught by telecommunications and I think learning about the "other end of the line" is important.

Brian also concurs with the notion that "text facilitates, but doesn't breed a close connection between two people that have never met before." He recommends increasing the sensory aspect through pictures or some other nontextual interaction (perhaps videoconferencing). Clearly, the "knowing" factor needs to be increased in CIER—methods for this will be discussed in the Conclusion section. There is, however, another side to this discussion that surfaced in Gary's reports. Although he stated that "the more notion I have of a situation and perspective of the teachers and students, the better I am able to respond," Gary did feel that there was another side to this issue, namely that:

> one of the pleasures, I feel, of the medium to gradually develop a sense of people and schools from the interactions and texts. I think its a significant aspect of the conference that the participants are able to create a persona/ ostensible perspective/aesthetic virtually, through text, freed from corporeal restraints, and other norms of non-conference social interaction. It is a great strength of Writers in Electronic Residence that students are able to exist (at least to others in the conference) through their textual representation alone.

Regardless of the lack of "knowing" that some felt hindered or shaped the interactions, many spoke of the community that developed. It seemed that less knowing about who was at the other end did not preclude a communal atmosphere developing—a kind of camaraderie among the members of the CIER forum, or, shall we say, the CIER community.

> *Brian*: The notion of just how does the "electronic community" fit in is critical. When the tools can be used to create not only a larger community, but a larger intelligence, I think you have done something very important. You were able to create not only a "collective" community, but more importantly, a "connective community." While the common thread of musical intelligence served to provide a common thread, the diversity of per-

spectives brought by each of our understandings about teaching and learning create a greater breadth of connectivity across ideas. This is the coolest thing about it for me.

In addition, Wayne spoke of the group communication in a supportive environment where there is room for people to "grow, develop, and learn"—traditional community attributes. The conferencing forum could have played a role here in helping shape this textual community. It seems, as well as a tribute to the members, an indication that the technology did not stand in the way of a very human outcome—a group of people coming together to discuss a shared interest and forming a kind of community. However, Ed pointed out that access to the community could be a problem from a technical perspective:

> The gateway that we were using with the school district was *extremely* unreliable to say the least. There was a time when [it] would crash on a *daily basis*! This is not dependable enough for this purpose. If that cannot be corrected, I recommend that my site use a phone and separate provider for Internet time.

Access is an important consideration in the creation of a community, online or otherwise. Although Ed's lack of participation in the community was not a result of any overt attempts at marginalization, we need to remind ourselves that technical considerations limit access and this needs to be considered by all members.

Composition and Technology

The topic of composition was obviously of significant importance in the reports. However much of the discussion was technical in nature and, thus, I hesitate to present it here. I am making the assumption that the reader may be interested in the more general notions of conferencing. I will thus move on to an important area of consideration in educational teleconferencing, that of participation.

> *Maud*: As a music educator who wishes desperately that we could get more composition activities into our school music classes, the computer comes about as an incredible tool which allows instant sign/sound or sound/sign "gratification". This opens up the possibility for young (and untrained) people to create, change, write, and forever save musical compositions. We've never had this opportunity before ... technology is allowing this project to go beyond the constraints ... of (the) notational and theoretical ability of students (via composition software).

> *Brent*: Many more teachers understand the importance of composition in music curriculum. Composition is even one of MENCs National Standards for music education.

Participation

All teachers reflected on their relative amounts of participation in the conference and spoke of factors that hindered this participation. I was interested in this part of the report to see if any facet of CIER itself was involved. For example, did schools feel marginalized because of the differing levels and opinions? Did students feel bullied or intimidated? Did teachers? Quite thankfully, no one reported any problems of this sort and all five teachers mentioned that they would like to increase their participation in the next session. Most of the problems were either technical or rooted in the school scheduling. I will review each here.

Brent saw his school's limited participation as a function of their studio setup. Most of the machines are not compatible with General MIDI (an industry standard), which created some patching (sound assignment) problems and a lot of extra work that still might achieve less than perfect results. He says that they are upgrading to all GM format and thus hope to be more involved next session. Ed, as we noted earlier had Internet problems (dedicated lines, RAM, etc.).

Both Brian and Wayne lamented their classroom schedules, with continuity being the problem. Brian saw his pupils once in a six-day period, and Wayne saw his in brief, intense periods during which students were not able to "get a composition sent off in time." Wayne also mentioned the GM deficiency as being bothersome.

Marcia, not surprisingly, reported no problems. She has a fully equipped GM lab, and her school has long been on the Web—they even have their own server. Her classes meet all year and are in a composition workshop format. Marcia has participated in many e-mail projects and continues to do so.

It is clear that a few key areas affect participation—GM format (or lack of), good Internet access, and scheduling. Perhaps these issues should be emphasised for new schools wishing to participate and participating schools who have dealt with these limitations can help with appropriate solutions. The Internet connections, however, are problematic. Participants require full Internet access to connect to the FirstClass server. In addition, they had to be connected for long periods of time because there was no offline reader in the software and all dealings with the conference had to be done while connected. The latest version of FirstClass does, however, provide an offline reader, so schools having difficulty with online costs or continual access may benefit from this new function.

Conclusion

Clearly CIER has become a useful and desirable addition to these teachers' music classrooms, but the logistics of time; scheduling; Internet access; and mastering the technical subtleties of telecommunications, computer conferencing, and MIDI technology are factors that can affect participation, regardless of the good intentions of the teachers. Ideally, some of these problems can be overcome by creating a provision for a "place" within the conference where concerns and issues such as these can be addressed. With CIER, I believe that providing these forums, beyond the basic educational function (i.e., the music exchange) has helped create a richer, less hierarchical community—a community in which participants can share their thoughts on this new and innovative form of communication and, more importantly, confront and solve problems as they arise. I would encourage facilitators who create and maintain online conferences to provide an area where participants can take an active role in discussing and shaping the conference's operating tenets. This is, and will continue to be, my goal in facilitating Composers In Electronic Residence.

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News Bits

edited by Gleason Sackman

Partners' Activity Guide for America Goes Back to School

With the new school year beginning, some of us may be wondering what we can do differently this year, right here in our school and community, to improve learning for our children?

Ideas for developing your own answers to that question are available in the new America Goes Back to School: Get Involved! Partners' Activity Kit, 1996–1997. Unveiled last week on the initiative's new home page, this kit offers dozens of suggestions for creating community-based partnerships around seven challenges:

- Making schools safe, disciplined, and drug-free.
- Encouraging parent and family involvement.
- Helping America become a reading, literate society.
- Achieving high standards and real accountability.
- Making technology available.
- Preparing young people for careers.
- Making college more accessible.

The kit includes selected resources for each of the seven challenges, a sample proclamation and local school board resolution, activities from last year's back-to-school initiative, and more. It's available at

http://www.ed.gov/Family/agbts/

For a paper copy, please call 800/USA-LEARN.

The following sections give background on this initiative and excerpts from the new Partners' Activity Guide.

Background

America Goes Back to School: Get Involved! is sponsored by more than 600 family, education, employer, religious, and community-group members of the Partnership for Family Involvement in Education initiative and the U.S. Department of Education. It is designed to focus attention on improving education across America during the back-to-school time of August through October. Parents, grandparents, community leaders, employers and employees, members of the arts community, religious leaders, and every caring adult are encouraged to play a more active role in improving education in their communities. Steering Committee members include cochairs Tipper Gore; Bo Jackson; Joan Dykstra, National PTA President; and Dr. Ted Sanders, President of Southern Illinois University.

Virginia High School PTA Reinvents Itself

When Coleman Harris became president of the Mount Vernon High School (Alexandria, Virginia) PTA in 1994, the same 8–20 people attended the monthly meetings. To increase interest in children's learning at the school, Harris worked with the school administration and the community. They developed mission statements for both the school and the Parent–Teacher–Student Association (PTSA). The PTSA succeeded in enlisting 100% of the teachers, who then brought students and parents on board.

Perhaps the most effective action for increasing involvement at the school was to change the structure of the PTSA itself.

> Parents want to be involved in the area of the school where their son or daughter is most active or directly involved... so we reorganized to establish one Parent Council for each grade. We also organized Community Resource Teams, composed of parents and nonparent[s], to support all academic programs at the school.

With so many community supporters, the PTSA now sends its newsletter to local community members as well as to parents. To keep the community aware of the importance of educational accomplishments, the local McDonald's, in partnership with the school, exhibits photos of the school's honor-roll students, varsity athletes, and successful graduates in display cases in the restaurant.

Student Assignment Book

To support students in their learning outside of school, the National Catholic Educational Association developed a student assignment book with helpful hints on how to study and do homework. Parents check and sign their child's homework each day and keep a record of it in the book. Another feature of this book is space for a weekly written dialogue between the parent and teacher about the child's progress.

Teachers and principals encourage the parents to use this space as soon as they have any question about their

child's work or anticipate a potential difficulty that impedes learning. Most often, these written dialogues lead to three-way conferences among parents, students, and teachers to help the child. In the 1995–1996 school year, 30,000 students and parents nationwide used the book.

Lynndale Elementary Links School, Families, and the Community

Lynndale Elementary School, in Seattle, Washington, takes advantage of technology to link the school to families and the community. Each staff member has an individual voice-mail number. Parents may call a teacher's voice mail to learn about homework assignments and classroom events, or to leave a message for the teacher. A Parent/Staff Technology Planning Team generates ideas for networking, fundraising, software and equipment purchases, and possible home–school connections. Family Computer Lab invites parents and students to explore computers together during late afternoon or evening hours. This lab is designed to provide opportunities to families of Title I funded students or students who do not have computers at home. Volunteers assist students in developing presentations and in producing student-designed books and videos using computers, CD-ROMs, and video cameras.

Technology Unlocks the World of Learning in West Virginia

Michael Smith is a first grader at T. A. Lowery Elementary School in Charles Town, West Virginia. Because of oxygen deprivation at birth, Michael is unable to sit, stand, or walk. However, with the help of assistive technology, Michael is the first child with multiple disabilities to be fully included in a regular first-grade classroom in his school system. He participates with his peers in class by using an "Intellikeys" keyboard to access a personal computer, and he uses an adapted chair to sit with his classmates at the reading table. According to Michael's mother, "Assistive technology has unlocked my son's intellect. It has allowed him to express himself—not only to me, but to the rest of the world. I can only imagine the possibilities for his future."

Parent Reading Program (Houston Public Library, Texas)

The Parent Reading Program of the Houston Public Library is a community-based family literacy program that was developed and refined by the Houston Public Library with federal library and Title I grant moneys. The program is an eight-week course for parents and preschool children. Classes meet twice a week, for one hour at a time. Adults meet in one class with the teachers, and children meet in a story hour with children's librarians. Currently supported by the Houston Area Booksellers Association and the Houston Chronicle, the Parent Reading Program changes families' attitudes about libraries.

John Hancock Financial Services Sponsors Kids-to-Go (Boston)

What happens to children when school is closed but the workplace isn't? Since 1990, John Hancock's Kids-to-Go program has provided day-long supervised activities for employees' school-aged children (6–14) during school holidays. The daily cost per child is $20, although scholarships of $10 per day are available to employees' whose income does not exceed $30,000. Children bring their lunch. With enrollment based on a first-come, first-served basis, as many as 50 children can participate each day. The children's activities are staffed by child care professionals, and vary by season and by the ages of the children. Activities have included roller skating and bowling, harbor cruises, visits to local museums and zoos, Red Sox games, and movies and shows. Children who participate in the program are covered under the company's umbrella insurance policy.

GTE Corporation Helps Families Plan for College

Communications giant GTE Corporation admits to keeping its workers busy. That is why the company held a teleconference recently to teach employees and their children the ABCs of college planning. The college planning seminar gives working parents the information they might not have the time or resources to research on their own. Asking everything from how to pay for college to where to send applications, 1,400 employees and their children attended the college planning seminar. GTE originated the interactive teleconference from four major plants and broadcast it live to 18 of the company's buildings across the country. The day-long seminar featured panels and experts who answered questions and gave presentations on college admissions, financial aid, and student life. Selecting a college will be easier for many families because the seminar walked them step-by-step through the process.

Oakland Health and Bioscience Academy Magnet School

Parents and students participate in decision making at the Oakland Health and Bioscience Academy where the emerging needs of health- and science-related industries and current local job market trends structure the cur-

riculum. The academy is a school-within-a-school magnet program that is open to all students in the district. During their intensive 3 or 4 years of study, academy students spend up to 80% of their day in integrated academic and lab classes. In related worksite learning experiences, they volunteer and do job shadowing, career exploration, clinical rotations, summer and senior-year internships, and career portfolios. Recent evaluations showed that academy students achieve substantially higher grade point averages and rates of graduation, attendance, and college admission than other students at Oakland high schools. Business partners of the academy, who also collaborate with teachers on the curriculum, include Kaiser Permanente, local hospitals, Johnson and Johnson, IBM, and the Berkeley Repertory.

Great Electronic Library

The Michigan Electronic Library is a free resource available on the World Wide Web that evaluates and organizes over 7,000 Internet resources in the following 13 subject areas:

- Business, economics, and labor.
- Children and young adults.
- Education.
- Government, politics, and law.
- Health information resources.
- Humanities.
- The Internet, computers, and technology.
- Libraries and information science.
- Michigan.
- News, media, and periodicals.
- Reference desk.
- Science and the environment.
- Social issues and social services.

Thirteen professional librarians who are experts in their fields search the Internet for resources with quality content and recognized authority. They then arrange their collections using subject headings that make the most sense for their intended audience. Our collection policies are online and we offer a search engine to help people find what they need. A MEL Advisor Service will be launched next week to offer online help to our users.

MEL was the first virtual library on the Internet when it debuted as GoMLink in 1992. MEL is now branching out into services for Michigan librarians and citizens and community information networking. Come visit us at

http://mel.lib.mi.us/

Science Web Sites

This list was compiled by Joan Berger, Internet Educational Consultant, k12robzj@hofstra.edu.

Archaeology and Anthropology

http://www.sscf/ucsb/edu/anth/
http://www.primate.wisc.edu/pin/
http://rs6000.bvis.uic.edu:80/museum/Dna_To_Dinosaurs.html
http://ucmpl.berkeley.edu
http://www.culture.fr/gvpda.html
http://dmf.culture.fr/culture/gvpda-en.htm
http://www.memst.edu/egypt/main.html http://aucamer.eun.eg/museum/html
http://www.maco,.co.il/museum/index.html
http://www.elron.net/n_sci_museum
http://www.hcc.hawaii.edu/dinos/dinos.1.html

Biology

http://inform.k12.mn.us/wolf.html
http://www.usc.edu/dept/garden
http://www.biology.com/
http://esg-www.mit.edu:8001 /esgbio/chapters.html
http://www.comet.chv.va.us/quill/ (Cells)
http:// www.chem.purdue.edu/courses/chm538/indox.html
http://www.ou.edu/research/ electron/www-vl/

Chemistry

http://www.scimedia.com/index.htm
http://www.shef.ac.uk/ ~ chem/web-elements/
http://www-c8.lanl.gov/infosys/html/periodic/periodic-main.html
http://www.classroom.net/mote.htm
http://www.chem.vt.edu/chem-ed/org-home.html
http://webbook.nist.gov/chemistry/
http://hub.terc.edu:70/O/hub.owner/other/Bala/lesson_plans/chemistry (Indicators)

Earth Science and Geology

http://sdcd.gsfc.nasa.gov/ESD/index.html
http://volcano.und.nodak.edu/
http://galaxy.einet.net/images/gems/gems-icons.html
http://www.usatoday.com/weather/wteach.htm
http://www.bvis.uic.edu/museum/index.html

Environment/Plants/Animals

http://www.envirolink.org/EnviroLink_Library/
http://www.nceet.snre.umich.edu/classres.html#top

http://www.epa.gov/ http://www.tnc.org/
http://www.nceet.snre.umich.edu/Endangered.lhtml
http://www.tnc.org (conservation)
http://www.audubon.org/audubon/contents.html
http://www.gorp.com/
http://interact.uoregon.edu/MediaLit/WFAEMenu (Acoustic Ecology)
http://gwis.circ.gwu.edu/~greenu/inde2.html
http://www.nj.com/yucky/worm http://www-wane-leon.scri.fsu.edu/~mikems/ (Florida Wildflowers)
http://gagme.wwa.com:80/~boba/spider.html (spiders)
http://www.pacificrim.net/~nataure/
http://iguana.images.com/dupecam.html
http://www.primenet.com/~brandon/ (spiders)
http://phylogeny.arizona.edu/tree/phylogeny.html (Tree of Life)

Frog Dissection
http://www.cs.yale.edu/HTML/YALE/CS/HyPlans/loosemore-sandra/froggy.html
http://curry.edschool.Virginia.EDU/~insttech/frog/
http://george.lbl.gov/ITG.hm.pg.docs/dissect/info.html
http://www-itg.lbl.gov/ITG.hm.pg.docs/Whole.Frog/Whole.Frog.html

Health and Medicine
http://www.slackinc.com/matrix/
http://www.housecall.com
http://www.nlm.nih.gov/ http://web.fie.com/fedix/nih.html
http://www.scoi.com
http://indy.radiology.uiowa.edu/VirtualHospital.html
http://visembryo.ucsf.edu/ http://h-devil-www.mc.duke.edu/
http://count51.med.harvard.edu/ http://nytsyn.com/medic/ (Health Daily)
http://www.achoo.com/ http://marvin.uchc.edu/hlthmark.htm
http://www.nlm.nih.gov/ (Hyperdoc)
http://vh.radiology.uiowa.edu/ (Virtual Hospital)
http://www.yahoo.com/Health
http://nhic-nt.health.org/odphp.htm
http://medhlp.netusa.het/readme.htm

Human Anatomy
http://www.nlm.nih.gov/extramural_research.dir/visible_human.html
http://aloha.net/%7Ejms/brainuse.html
http://www.umdnj.edu/~chamberl/sklanat/sklanat.html
http://serendip.brynmawr.edu/~pgrobste/blindspot1.html
http://sln.fi.edu/biosci/heart.html (Heart)
http://www.umdnj.edu/~chamberl/sklanat/sklanat.html (Skull)

Meteorology
http://thunder.atms.purdue.edu/
http://www.intellicast.com
http://www.infi.net/weather
http://www.nnic.noaa.gov.weather.html
http://pixi.com/~ghattoga/index.html
http://vortex.plymouth.edu/usamap.html
http://groundhog.sprl.umich.edu/
http://www.ncdc.noaa.gov/
http://tycho.usno.navy.mil/srss.html (time zones)
http://unidata.ucar.edu/staff/blynds/tmp.html (temperature)
ftp://vmd.cso.uiuc.edu (wx) ftp://wilbur.stanford.edu
telnet://hermes.merit.edu (um-weather)
http://faldo.atmos.uiuc.edu/w_unit/weather.html
http://wx3.atmos.uiuc.edu/ (The Daily Planet)

Nutrition
http://mach5.ecs.ucl.edu/food.html
http://vm.cfsam.fda.gov
http://fscal.fscl.umn.edu
http://www.deltanet.com80/2way/egg/eggpage.html
http://www.osf.org:8001/boston-food/boston-food.html
http://www.ilcnet.com/~nutrition/

Oceanography
http://www.bev.net/education/SeaWorld
http://turnpike.net/emporium/C/celestial/epsm.htm (Sharks)

Physics
http://nike.phy.bris.ac.uk/dr/ask.html
http://physics.nist.gov/PhysRefData/contents.html
http://uptown.turnpike.net/L/lindeman/physics_ub.html
http://www.tp.umu.se/TIPTOP http://www-ed.fnal.gov/ (Fermi Lab)

Rainforest
http://mh.osd.wednet.edu/ http://www.ran.org/

Science Resources

http://www.gene.com/ae/RC/

http://www.yahoo.com/education/k_12

http://www.exploratorium.edu/

http://kendaco.telebyte.com:80/billband/Possibilities.html

http://www.ncsa.uiuc.edu/Cyberia/Expo/

http://www-sci.lib.uci.edu/HSG/RefCalculators.html (sci.calculators) http://www.wentworth.com/

http://www.discovery.com/DCO/doc/101 (Discovery Channel)

http://www.exploratorium.edu/

http://www.tc.cornell.edu:80/Edu/MathSciGateway/about.html

http://pharmdec.wustl.edu/YSP/MAD.SCI/MAD.SCI.html (Ask a Scientist)

http://www.southwind.net/~phmslib/science.html

http://www.sciencedaily.com/index.htm

http://galaxy.einet.net/galaxy.html (Topic listing)

http://sln.fi.edu/tfi/welcome.html (Franklin Inst.)

http://www.nsf.gov/ (National Science Foundation)

http://www.xensei.com/users/ileneh/edulink.html#science

http://www.cybertown.com/ccampaero.html

http://www.sojourn.com/~katrina/web/

http://ftphome1.gte.net/jwagner/edujump.htm

http://hub.terc.edu:70/hub/science

http://www.askanexpert.com

Search Engines

http://www.albany.net/allinone/all1www.html (every engine-all on one page)

Space/Astronomy Sites

Listserv Addresses

NASA News

pds-listserver@space.mit.edu

Earth and Sky

Majordomo@lists.utexas.edu

To subscribe to Earth and Sky mailing list, send subscribe command in an e-mail message: subscribe EARTHANDSKY yourname@host.domain.name.

Astronomy Discussion

listserv%gitvm1.bitnet@listserv.net

This is an stronomy discussion list based at the Georgia Institute of Technology. To join, send subscribe message.

HASTRO-L

listserv@wvnvm.wvnet.edu

To join, send subscribe message.

ASTRONOMY

astronomy-request@bbn.com

This list contains events of interest to astronomers. To join, send subscribe message.

SPACE

space-request@andrew.cmu.edu

Discuss outer space on this list. Send subscribe message to join.

University of Georgia listservs

listserv@uga.cc.uga.edu

To join, send the following message:

subscribe < listname > Your Name

The lists are the Space News List (spacenws), the Space Policy List (spacepol), the Space Policy List (spacesci), and the Space Shuttle List (space-sh).

Anonymous FTP Sites

nic.funet.fi /pub/astro dftnic.gsfc.nasa.gov (Goddard Space Flight Center)

seds.lpl.arizona.edu

explorer.arc.nasa.gov

tezuka.rest.ri.cmu.edu

pubinfo.jpl.nasa.gov (Jet Propulsion Laboratories)

sseop.jsc.nasa.gov (Johnson Space Center)

ames.arc.nasa.gov/pub/SPACE

io.cc.gettysburg.edu

ftp.univ-rennes1.fr

oak.oakland.edu

ftp.spies.com/Library/Article/Aero/*/Library/Article/Aero/

space.acstsci.edu/stsci/steis/*(Hubble Space Telescope)

julius.cs.qub.ac.ak/pub/SpaceDigestArchive

delcano.mit.edu (NASA News)

spacelink.msfc.nasa.gov

pilot.njin.net/pub/SpaceNews

photo1.si.edu/images/gif89a (Smithsonian)

archive.afit.af.mil/pub/space

images.jsc.nasa.gov (Manned Space Flight Pictures)

ftp.gsfc.nasa.gov/pub/images/

umbra.gsfc.nasa.gov/images (solar views)

clementine.sl.gov/pub/clementine

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T.I.E. News Volume 8 Number 2

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Submission of Manuscripts

T.I.E. News is published quarterly by the International Society for Technology in Education Special Interest Group for Telecommunications. *T.I.E. News* solicits articles on aspects of K-12 and college instructional use of telecommunication, with emphasis on computer-mediated communication.

Manuscripts should be sent via e-mail as file attachments (*Word* or *WordPerfect* preferred). ASCII text in e-mail messages will also be accepted if attachments are not possible. Submissions sent ny land mail should be sent on 3.5" Macintosh or DOS/*Windows* diskette.

Send mail to:

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Faculty of Education
York University
North York, ON M3J 1P3
CANADA
E-mail: tie@edu.yorku.ca

Call for Articles

Open Call

Contributors are welcome to submit articles to *T.I.E. News* on any topic related to telecommunications in education. Because *T.I.E.* is a reflection of field-based activity that embraces novice and expert alike, we accept a wide range of material, from anecdotal reports of current projects to scholarly research.

Theme Issues

T.I.E. News will post calls for articles on particular themes in this space each issue.

For more information on submitting to *T.I.E. News*, please refer to "Submission of Manuscripts" in the first column of this page.

INTERNET & THE CURRICULUM
Deadline: February 15, 1997

Educators everywhere, it seems, are experiencing calls for change—at times dramatic change—from a variety of arenas. Reform, innovation, accountability, doing more for/with less while preparing for the new millenium create conflicting sets of demands.

In this call, *T.I.E. News* is looking for submissions that consider how online learning initiatives are integrating into the curriculum. Is your work well received, or shaping new directions in your institution? How is it fitting into existing programs (well or poorly), and what can we learn from your assessment of experiences to date?

ONLINE MENTORSHIP
Deadline: April 1, 1997

What are the ways in which online mentorship experiences change the roles and relationships among educators and learners? How, for instance, is professional practice informed by the mentorship of online guests, or of other students, who may "visit" one's own classes electronically?

In this call, *T.I.E. News* is looking for submissions that consider how experiences with online mentorship have changed the learning culture of classrooms.

GRADUATE STUDENT RESEARCH—A SERIES ON THEORY AND PRACTICE
Deadlines:
August 15
November 15
February 15 [new deadline]
April 1

T.I.E. News wants to hear from graduate students who are undertaking research in educational telecommunications. Manuscripts should be between 1500 and 2500 words.

In this series, *T.I.E.* is especially interested in publishing articles that clearly reveal the relationship between theory and practice.

Coauthored submissions (e.g., with supervisors, group submissions from graduate courses, etc.) are welcome.

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T.I.E.

Telecommunications in Education News

Volume 8 Number 3 May 1997

Creating the Future We Promote: A Keynote Speaker's View of Tel•Ed '96

by Kathleen Fulton

Telecurricular Teaching and Learning: The Impact of World Wide Web Access on the Instructional Process

by Dorothy Valcarcel Craig

INTERNATIONAL SOCIETY FOR TECHNOLOGY IN EDUCATION ISTE

ALSO THIS ISSUE:

- **AUTHOR AND SUBJECT INDEXES, VOLUMES 1–7**

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Editor's Message

Trevor Owen

T.I.E. Gets An Index

I know. It's really about time. After eight volumes, one might expect that T.I.E. would have made arrangements for an annual index before now. All the more reason, I suppose, to be as pleased as I am to announce that *T.I.E.* will publish an annual index of articles in the last issue of each year's volume. In fact, we will publish two: one listed by author, and one listed by subject. This annual list will begin to appear in our next issue, which will be the last of volume 8 (8#4).

Of course, that leaves seven volumes to account for, so we will address the backlog by catching up the indexes for volumes 1–7 in this issue. Many thanks to Jennifer Roland for pulling this project together (after all her time as Associate Editor, she finally gets a byline!) On both counts, then, better late than never!

And now, to this issue.

Internet and the Curriculum

Educators everywhere, it seems, are experiencing calls for change—at times dramatic change—from a variety of arenas. Reform, innovation, accountability, doing more for/with less while preparing for the new millennium create conflicting sets of demands.

In this call, T.I.E. News is looking for submissions that consider how online learning initiatives are integrating into the curriculum. Is your work well received, or shaping new directions in your institution? How is it fitting into existing programs(well or poorly) and what can we learn from your assessment of experiences to date?

Our last issue (8#2) considered the impact of online experiences "In the Classroom." In this issue, we shift our focus somewhat to the integration of Internet-based learning into the curriculum. Dorothy Valcarcel Craig presents work that considers the impact of the World Wide Web on the instructional process in a very practical manner. *T.I.E. News* readers who may consider themselves fairly new to online learning may find this piece particularly useful, as it focuses on several key questions in the context of the ConnecTEN project, undertaken in Tennessee.

Report: Tel•Ed '96

Kathleen Fulton, Associate Director for the Center for Educational Technology and Learning at the College of Education, University of Maryland, provides her personal reflections on the challenges and aspirations of Tel•Ed '96, which was undertaken last December in Tampa, Florida, and Monterrey, Mexico. Her reflections are timely and will be of particular interest to anyone who was (and is) intrigued by the lessons provided by our initial foray into blending face-to-face contexts with multiple technologies.

Associate Editors Wanted

T.I.E. News has benefited from the service of an interested (and interesting!) group of Associate Editors—and we're looking for more! I would like to invite others who may be interested in serving as Associate Editors of *T.I.E. News* to contact me at tie@edu.yorku.ca.

We are looking for international perspectives from individuals who can report on interesting initiatives in their countries, and who are interested in contributing an article each year, nurturing new authors, or both.

Best Wishes

Our usual features appear in their usual spots. Gleason Sackman's "News Bits" has been collected from entries that were submitted previously, but not printed for lack of space. I know all *T.I.E.* subscribers and contributors will join me in wishing Gleason well during his recovery from recent surgery.

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T.I.E. is also pleased to welcome Steven Summerlight in his role as Associate Editor for the SIGs. He replaces Jennifer Roland, who has gone on to serve as Assistant Editor for *Learning & Leading With Technology*. Congratulations!

If I may be permitted a small indulgence in my role as your editor, I would like to acknowledge Jennifer Roland's contribution to *T.I.E.* in particular and, of course, to ISTE in general. Our readers have benefited time and again from her good counsel, cheerful manner, and production acumen. On behalf of all *T.I.E.* subscribers, I extend our best wishes to you on your future endeavours with ISTE.

Trevor

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President's Message

Chuck Lynd

Would you rather travel to attend a conference and engage in face-to-face dialogue or interact with colleagues at a distance using television or computer screens to mediate conversation?

Most of us would prefer to be "in person," but electronic communications are steadily carving their niche in a growing spectrum of options. Distance learning and virtual meetings, for example, are now relatively common thanks to improvements in computer and video-conferencing systems. As a member of SIG/Tel and reader of T.I.E. News, you probably have accessed the SIG/Tel listserv (listserver@lists.acs.ohio-state.edu), subscribe to an online forum for educators, or participate in a newsgroup to discuss issues related to teaching, learning, and technology. In reality, most of us now use a mix of electronic and face-to-face communications that best suit our needs, pocketbooks, and travel schedules.

But what if you could have the best of both worlds? There are unique features and benefits associated with both online and face-to-face communications, so why not design a conference that takes advantage of each method? That is the approach adopted by ISTE in planning for Tel•Ed Multimedia '96. In case you were unable to attend last December, I am pleased to report that SIG/Tel's vision for this ground-breaking conference was realized last December in both Monterrey, Mexico, and Tampa, Florida. For the first time, attendees had the opportunity to interact face-to-face in each physical location as well as virtually through sessions that linked participants internationally via satellite, telephone, and computer-based video conferences.

The opening session, "Live from Mexico . . . and Mars: Electronic Field Trips to Learning Frontiers," showcased an imaginative use of telecommunications that allows teachers and students to interact with Mexican anthropologists and archeologists at the Mayan site of Chichenitza as well as NASA scientists and engineers who were in contact with the Mars Global Surveyor spacecraft through Mission Control in Denver, Colorado. Those of us in the audience were spellbound by live satellite feeds that let us experience the excitement of learning from experts about the roots of astronomical observation among the Mayans and the fruits of that quest in our contemporary probes to unravel the mysteries of the red planet via space-age technology. The presentation at one point juxtaposed images of a Mayan observatory whose architectural form bore a remarkable resemblance to today's modern observatory structure. The project, "Passport to Knowledge" (http://quest.arc.nasa.gov/mars), not only demonstrated with dramatic force the power of telecommunications for students, but also served notice that this conference was going to do more than talk about telecommunications as educators in Mexico and the United States began to watch and listen to reactions from one another. We were doing it!

Thanks to the leadership of our own board member, Margaret Riel in the United States, soon-to-be board member Lilian Kravzov Appell of Nuevo Leon, Mexico; and many others too numerous to list individually, the Tel•Ed Multimedia conference self-consciously embarked on the task of integrating telecommunications into the design and structure of the conference-going experience. Once the decision was made to work with two site committees in different countries, the die was cast. ISTE headquarters issued a historic call for papers that asked presenters not only to select either the Mexico or the U.S. site, but also to propose sessions that would use distance-education media to link with audiences in both locations. Although most sessions were conducted in the traditional manner, innovators responded to the opportunity and developed presentations that allowed attendees to experience the future of professional development without walls.

Seven "education bridge" sessions punctuated the conference agenda, each highlighted to alert attendees that these sessions would use videoconferencing equipment to link with presenters and attendees at the other site. Classroom-based projects that use telecommunications media to link with experts and other classrooms at a distance were a natural subject for some of the bridge sessions, but others linked panel-

ists who were able to discuss curriculum and pedagogical issues in a lively international format. In addition to the bridge sessions, a special "transporter" room was established at each site. These rooms were equipped with desktop video cameras and software to support a shared conference experience by creating windows into the other site. The transporter room also housed the conference "Web tour" sessions to demonstrate educational resources on the Internet. This lab-like setting was made available throughout the conference to encourage participants to explore the Internet and communicate informally between the sites.

Many technical support staff members worked long hours to wire the convention center rooms, coordinate satellite communications, establish a video-conferencing bridge between Sprint and GTE (a sponsor at the Tampa site), install high-speed data lines, and generally make access to the Internet available for presenters and attendees who were able to check their e-mail accounts at public workstations. There is no doubt that putting on a high-tech conference is complex, time-consuming, and expensive. As the technological infrastructure matures, however, what ISTE has achieved at Tel•Ed Multimedia '96 is very likely to become the new standard for education conferences. In the near future, don't be surprised if advance program fliers give you the option of attending a meeting in more than one location. You may not see all of your friends and colleagues in person, but you may well see and interact with them via distance-education teleconferences.

The Tel•Ed Multimedia '97 planning committee is already forging ahead with plans to add at least one country to its conference this year and each year thereafter. Austin, Texas, will be the host site in the United States, Monterrey will again represent Mexico, and Vancouver will be our first Canadian host. Site committees in several other countries are already beginning

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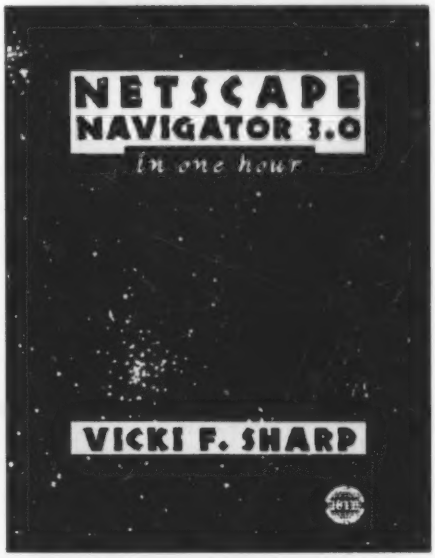

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Telecurricular Teaching and Learning:

The Impact of World Wide Web Access on the Instructional Process

by Dorothy Valcarcel Craig

As technology becomes commonplace in classrooms, teachers and students quickly develop a fluency that enables them to use computers as an effective part of the learning and teaching process. This technological fluency prompts teachers to look beyond school boundaries for new and innovative ways to integrate and infuse computers into their instruction. In many cases, online access to the Internet is the vehicle that is helping teachers extend their classroom technology. As Internet brings resources to the classroom, this new availability is having a tremendous impact on teaching and learning.

However, just where does this newly found window to a world of knowledge fit in the jigsaw puzzle that makes up classroom curriculum and instruction? Maddux, Johnson, and Willis (1996) outline several commonly used applications of classroom telecomputing, including interpersonal exchanges, information gathering, and problem-solving projects. It is when all three applications are combined and subsequently matched with curriculum, instruction, and assessment that a new type of classroom instruction and learning takes place.

Where Technology and Instruction Meet

One way to create this bond between classroom instruction, curriculum, and technology is to engage students in telecurricular projects. A *telecurricular* project is an online project that blends curriculum, instruction, and technology. The term itself implies that instruction follows an interdisciplinary or integrated approach, with one of the disciplines being technology and telecommunications. By developing projects that follow a telecurricular format, teachers enable students to learn, manage their knowledge, apply it, and share what they have learned with others.

Participating in a telecurricular project has an even greater impact on teaching and learning because of the curricular connections that students make as a result of the project. Instruction that incorporates concept-based, integrated curricula provides a new depth to learning and offers a focus on relevant issues, problems, and ideas for students (Erickson, 1995). Pairing this instruction with telecommunications and technology allows students to make the connection between academic subject matter and the world beyond the classroom. The relevancy that is created has a lasting impact on student learning. Educators who are interested in this type of instruction can find excellent examples of telecurricular projects on the Internet.

Tennessee's ConnecTEN Project

The ConnecTEN Project that was initiated in the state of Tennessee is one example of how online access and telecurricular instruction changed the way teachers and students viewed technology in the classroom. The ConnecTEN Project was the brainchild of Tennessee Commissioner of Education Jane Walters. As part of the state's bicentennial celebration, the visionary ConnecTEN Project involved teachers, students, and instruction. The backbone of the project consisted of six telecurricular project units. All six units combined student exchanges, information gathering, and problem solving with specific curriculum objectives, competencies, content knowledge, and skills. Designed by leading

Environmental Issues in Tennessee

Focus: Environmental Issues that Affect Tennessee

Grades: K–12

Question: What are the most important environmental issues facing Tennesseans now and in the future?

Culture, Folklore, and History of Tennessee

Focus: Aspects of Community Life Throughout Tennessee

Grades: K–8

Question: How can you understand the lives and culture of a group of people you have never met?

Lifelong Learning in Tennessee

Focus: Creating an Educational Complex for the Future

Grades: 8–12

Question: How do we encourage and enable the citizens of Tennessee to be lifelong learners?

Stepping Back into the Past: Echoes of Tennessee Historical Figures

Focus: Merging Instruction Across Grade Levels with Tennessee History

Grades: K–12

Question: During a critical event in a person's life, how did this famous Tennessean make decisions and affect history?

Work Is the Key in Tennessee

Focus: Explore the Future World of Work—What Will Be Available in Tennessee?

Grades: 9–12

Question: How can today's students be prepared for jobs that have not yet been invented?

Places in Tennessee

Focus: Virtual Field Trips to Remote Tennessee Sites

Grades: K–12

Question: How can you know a place you have never visited? How can you get to know other unique areas in Tennessee?

Figure 1

educators throughout the state, the project units focused on six different aspects of past, present, and future life in Tennessee (Figure 1). Some project units were designed to encompass all grade levels, kindergarten through 12th, while others were grade level-specific. For example, "Environmental Issues in Tennessee" is appropriate for all grade levels, while "Lifelong Learning in Tennessee" is designed for middle and high school students. In addition to information about the state, these inquiry-based project units were designed around a generic, four-part problem-solving model that encouraged students to answer the following questions:

1. What is the problem to be solved?
2. What skills are needed to solve the problem?
3. What resources are available or can be accessed to solve the problem?
4. What are some possible and reasonable solutions?

In designing the six individual project units, one set of criteria was followed. Criteria for the units address instructional objectives, student collaboration, community involvement, and the Tennessee bicentennial. Gathering, processing, and exchanging information

through student collaboration via telecommunications was at the heart of each of the six projects. This collaboration enabled students to extend the boundaries of their classroom, apply their knowledge, and teach others what they have learned. Many teachers and students who have successfully participated in one of the first six project units have used the model to design additional telecurricular units that focus on different areas of the curriculum.

The ConnecTEN Project's Influence

Educators around the country have taken note of the Tennessee project. For example, California educators have produced Goldrush, Missions, and Redwoods, which is scheduled to begin in the spring of 1997. This particular telecurricular project will focus on that state's history. Using an interdisciplinary approach to teaching with a strong component in telecommunications, the first phase of the California project will connect the state from north to south. In phase two, students in grades 3 through 5 will analyze their information and telecommunicate with students across the country.

Shaping the Classroom of the Future

These projects are unique, and they're changing the face of instruction and learning. No longer will students be required to remain within the confines of the classroom or school library. The impact that this type of instruction has on teaching and learning is twofold. First, as elementary school students successfully participate in telecurricular projects, they gain the skills to manage and analyze information. Passing knowledge to others enables students to internalize, connect, and understand. The lasting connections made by these students will move with them through middle and high school and eventually to the world of work while helping them more fully prepare for the future. Second, as teachers become more comfortable with this type of instruction, the walls of the classroom disintegrate. No longer are teachers isolated from adults and colleagues. The professional support that teachers have so greatly needed for centuries is only a keystroke away. Instruction becomes enriched with the expertise and experience of many instead of a few. New perspectives, methods, and materials become available through collaboration and Internet resources.

The infusion of technology in classrooms all over the world has caused a paradigm shift in teaching and learning. Classroom instruction has taken on a new role and moved beyond classroom restrictions to encompass a universe of available resources. The shift in teaching caused by the availability of technology in classrooms has had an enormous impact on student learning. No longer are students content to be passive learners. They are now managers of information as well as communicators and teachers. By participating in telecurricular instruction, students are able to use their natural interpersonal skills to solve problems, exchange information, and pass on the knowledge they have acquired to others.

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Maddux, C. D., Johnson, D. L., & Willis, J. W. (1996). *Educational computing.* Boston: Allyn & Bacon.

World Wide Web Sites

ConnecTEN Project:

http://www.state.tn.us/education/co-intro.htm
http://www.tennessee.200.org
http://www.state.tn.us/education/co-ctnst.htm
http://www.state.tn.us/education/tentrain.htm
http://www.state.tn.us/education/ctenproj.htm
http://tbr.state.tn.us/ ~ sibreld/index.html

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Creating the Future We Promote:

A Keynote Speaker's View of Tel•Ed '96

by Kathleen Fulton

Like many people in the field of educational technology, I have participated in dozens of conference presentations and have attended many more over the years. However, the Tel•Ed Multimedia '96 Conference, held December 4-6 simultaneously in Tampa, Florida, and Monterrey, Mexico, was an experience unlike any other. Meeting, working, and learning with educators from around the world; interacting in two sites simultaneously via multiple technologies; and catching the spirit of tomorrow in the futuristic setting of the Monterrey Centrex Conference Center—all of this convinced me that we were indeed creating the future we sought to promote Tel•Ed '96.

I would like to share the flavor of that experience in this article. What follows are my personal reflections on the process and lessons learned; they focus on the following questions:

How did this come about?
What made it different?
What were the special challenges and rewards?
How did we ever pull it off?
What lessons are there for others?
Finally, and most significantly, would I ever do it again?

How It All Started

The idea for the presentation "Designs for the Future: Visions and Discussions" came from several sources. In the course of conducting the Congressional Office of Technology Assessment (OTA) study "Teachers and Technology: Making the Connection," we recognized the need (1) to study the immediate challenge of understanding technology though the eyes of teachers and to recommend policies for supporting the most effective uses of technology for K-12 education, and (2) to consider how today's policies would shape future directions. OTA provided a unique resource for informed, bipartisan, scientific and rational decision making, and its publications analyzed science and technology issues and their implications for public policy. But we also wanted to help people consider how the technologies in place today and those on the drawing boards might affect education in the near future. Congress, we reasoned, should look beyond the two-, four-, or even six-year cycle of congressional, presidential, and senatorial elections and consider the long-term view. Consequently, in the fall of 1994, OTA invited five educators and scholars to write about their visions of the future intersections of education and technology. In June 1995 we invited our writers to join other prominent educators in a workshop to discuss these papers and the issues they addressed. The papers and workshop discussion were compiled in *Education and Technology: Future Visions*.

How ironic that this look to the future should be one of OTA's last publications. Unfortunately, despite shock and bitter objections from many in the scientific, technological, and educational communities, OTA fell victim to the 103rd Congress's slash-and-burn budget cutting. Our doors closed September 30, 1995, and this final education report was released in those last days of the agency without any of the usual congressional hearings, press conferences, or follow-up briefings to members of interested professional groups. I was looking for a forum to discuss this report and its thoughtful, incisive *Future Visions*.

Enter Tel•Ed '96, a different kind of conference—one that was trying to use technology as tool and resource for designing new ways of sharing ideas. With the conference slated to take place in two sites, two different countries, and two different languages simultaneously, the goal would be to use technology to create a sense of community and a shared agenda.

Margaret Riel, one of the authors of the *Future Visions* papers and a co-chair of Tel•Ed '96, encouraged me to brainstorm ideas for a education "bridge session" linking the two sites. Using *Future Visions* as a guide, I proposed an international panel to focus on where we were going with new technologies. Chuck Lynd, professor of education at Ohio State University, proposed a similar bridge session on education and the future. Seeking a keynote event that ended the conference with a vision of the future, Riel and her co-chair, Lilian Kravzov, suggested that Chuck and I work together and transform our proposed educational bridge sessions into a keynote panel to close the conference. We agreed to team up.

Making It Happen: Planning the Session

At this point, the panel planning was similar to that we've all done in the past—phone calls and ever more e-mail messages to colleagues soliciting their participation or ideas for others who might lend an international perspective to the issue. Coming up with a marvelous group of panelists was the fun part,[1] but balancing who would be at what site was another challenge. As we secured panelists, the conference chairs suggested we use video to provide alternate media sources for illustrating our visions of future technologies; this was in keeping with the conference focus on multimedia and bridges between the two sites. Were videos available that illustrated the kinds of technologies and school settings that had been described in the futures papers and other similar publications?[2] Well, yes and no, depending on whom you ask. By September 1996, Margaret and I had reviewed many tapes while we attended a panel meeting in California. No one tape was perfect, and, even with just the two of us, we could not agree on which would be the best segments to show. Word of mouth (or e-mail, to be exact) helped us track down other potentially interesting videos; best of all was the personal collection assembled by Chris Dede, then of George Mason University, who agreed to help us locate the best images to illustrate our presentation points. Many video segments were considered; many more were rejected.

Special Challenges

Once we determined who would participate, and from where, the real challenge was securing the agreement of our panel members on the format and content of the presentation. The technology we were working with was still limited. We had narrowed our scope to seven tapes, with a total of 12 segments illustrating key concepts (e.g., students collaborating on projects across distances, teachers working at home and using online resources, technologies that supported data collection and sharing from the field, new forms of access for students with special needs). But there was just too much material, and we wanted to work with our nine panel members from around the world and give them a say in what material we would show. The time for the conference (December 1996) was rapidly approaching. By November, we dubbed the best excerpts onto a master video, with a narrative describing how these segments fit with our discussion areas. We mailed copies of this "draft video" to all the panelists and requested their comments and suggestions. With the Thanksgiving holidays in the United States, quirks of international mail, and complex international travel plans of some of the panelists, not everyone was able to preview the tape before they got to Tel•Ed '96. Those who had previewed it had differing, and strongly held opinions, of which segments should be used, and how they would inform the session. We arrived at our respective sites at Tel•Ed '96, still planning. As a session chair, I found it to be an uncomfortable situation, especially when the session was the final keynote event, featuring a live bridge between the sites.

More Technology to the Rescue

Our nervousness was relieved by the news that we would have access to the "transporter rooms" in Tampa and Monterrey, each with an Internet link and CU-SeeMe technology. Chuck and I agreed to assemble our panels in our respective transporter rooms for a group discussion to finalize the plans the day before the session.

Like everything else, this wasn't so easy. Have you ever tried to schedule a meeting for eight people in the midst of a conference in which they have other presentations to give or attend, or other meetings set up

with colleagues? How about scheduling it when the time zones and conference schedules (e.g., lunch times) are different? How about just trying to locate people (again, across two sites) to be sure they all know the room locations and time—none of which we'd been able to arrange ahead of time? Amazingly, when the time came for us to meet, Chuck had gathered most of the members of his panel in Tampa, and my Monterrey panel had assembled and was ready to talk.

Chuck had used Cu-SeeMe before, but my Monterrey panelists and I were relative novices in working with CU-SeeMe technology. Add to this the thrill of holding this dual site meeting in a transporter room—a window to the other conference site—that was a very public setting in the Monterrey exhibit hall. There were lots of people gathered around us, watching and trying to help, with lots of chatter and all the attendant excitement of those interested in seeing a "live demo" of this technology. Not the best conditions for a holding a private, "Let's get our act together and hammer out the details" meeting! We must have been interesting: Several observers said they found this "real use demonstration" much more informative than the more static demonstration of the technologies typically found in exhibit halls.

Technology always has its quirks, especially when it's needed most. The video link was more stable than the audio channel, but we all spent a lot of time saying, "Can you see us? We can't hear you." Like any meeting of a half a dozen people, all wanting to have their say, everything was complicated by the sheer mechanics of trying to work the technology. Cross-site communication became easier once Chuck and I figured out that we could use the synchronous message section and send typed comments back and forth to each other if we lost audio. But we were far from agreed, either across or within the two panel groups, as to which segments to use and how. Finally, after an hour of discussion locally and over the bridge, we began to reach consensus on how to cut down on the video to allow more reaction time, which video segments to use, and how panelists would respond to the different segments. What would happen if we were not connected or lost our connection in midsession? We had to finalize the video segments and find a way to show them at both sites with less chance of problems. There were many ideas, and I was left with translating everyone's concerns into a plan of action. Chuck and I agreed to meet again over CU-SeeMe the next morning to finalize the plans for the keynote presentation.

My nerves were frazzled, but at their insistence, I joined my supportive colleagues for a delightful Mexican lunch on the outdoor balcony of the spectacular Centrex Convention Center. Two cervezas later, I reluctantly headed out—not to my room for a siesta, but to the conference office center, where enthusiastic and extremely helpful staff members provided by the Instituto Latinoamericano de la Comunicación Educativa found me a computer on which to hammer out our new agenda. Again, the technology was a challenge. The keyboard was in Spanish, just different enough that my touch-typing led my fingers to the wrong keys; with the Help commands and other text material also in Spanish, things were just enough different to make even my friendly Word unfamiliar. Then came the excitement of trying to send the document to Tampa. For reasons I never understood (there was much huddled conversation in Spanish among the technical staff), my own Internet account wouldn't work, and we couldn't seem to Telnet or FTP; eventually, though, they found me a workable password. We hoped. To be safe, I also faxed a copy of the message to Chuck at the Tampa conference site. However, I realized I had no way to alert him that the e-mail and attachment had been sent, or that there was a fax awaiting his attention. Exhausted after working all afternoon, I returned to my hotel, hoping that somehow my revised and perhaps final agenda had somehow made it to Chuck "on a wing and prayer," if not by the magic of telecommunications.

Presentation Day

Saturday, the final day of the conference was a brilliantly sunny day in Monterrey (and pouring rain in Tampa, we heard). The day of our session was upon us, ready or not. We knew that bridge links between Tampa and Monterey were not in complete operation, and sessions intended to have live video and audio between sites had complications blocking one or more media connections, despite heroic efforts by conference staffers at both sites. It was unclear whether we would have *any* link with the Tampa site. To be safe, I had created three different agenda scenarios: Plan A assumed we had a live, perfect link between the sites; Plan B assumed that the link did not work and we had

to work as two totally separate panels; and Plan C assumed that the link worked on and off. My CU-SeeMe discussion with Chuck on Saturday morning just hours before the session revolved around how we would work with each scenario. As we signed off, agreeing to copy our agendas for our team members and to be prepared to "wing it," I felt a giddy combination of excitement and confidence that somehow it would all work. Or was this the result of my lunchtime cervezas?

A half hour before "showtime," we got exciting news: The bridging technology was in place, and all signs suggested we'd have a live link for the keynote after all! We could proceed with Plan A's live connection. As we assembled onstage and greeted our colleagues in Tampa, we were almost delirious with delight! The session worked—technologically and, most important, in terms of content. The panelists at each site gave opening remarks, translated into the appropriate languages at each site (well, my opening remarks in English were translated into Spanish for the Tampa audience, but that was quickly rectified), brief video clips were shown (the technical people at the two sites each played their own copy, using just the segments Chuck and I had noted—skipping over those on the master that had been rejected in our final plan), the panelists at each site offered reactions and reflections, and then we had an overall discussion.

We ran out of satellite time and our bridge to Tampa just as each site began its discussion period. Because we had hundreds of people in our local Monterrey audience, however, we had no shortage of questions from the audience. Working across two languages, we fielded the questions and then moved to closing remarks from each site. The satellite cutoff meant we couldn't hear each other's concluding remarks, but this allowed us to personalize our conclusions with our local audiences. I spoke of how this session, like the conference itself, provided a way to seed the future with visions of change as we use technologies to create communities of learners working together despite distances, language, and other barriers in pursuit of common goals. Moved by the quality of our collective participation, I was not the only one whose eyes filled with tears as the session ended with thunderous applause.

Postscript: Would I Ever Do It Again?

Was it worth the extra work, stress, and hassle to have a live interactive link? I believe so. As I said in my final remarks, to me the session mirrored everything we were discussing: that technology is a vehicle, perhaps a clunky one for now, for not just doing old things faster, but also trying new things. For example, even though there was nothing earth-shattering or groundbreaking in what we did in the session, the process forced new forms of collaboration. The biggest challenge to me was still the social one: getting a group of eight thoughtful experts to agree! Yet this was central to having a session that worked and stayed on track. And this social and cultural challenge was much of what the multinational conference was all about—ways for educators to come together and discuss and advance common concerns for education. My interactions with Luis Osin from Israel, Jose from Mexico, and all of the Mexican educators at the Monterrey site were among the richest treasures I took from the conference. Having to work together bonded us in a way that just rubbing shoulders at a meeting would have never done.

I realize that my perspective, as one of a small number of U.S. participants at the Mexico site, was influenced by all the other factors on site at Monterrey: the helpful staff, the eagerness of conferees to interact with those in the United States and to showcase the impressive strides they have made in advancing educational technologies. The technology itself was both the problem and the solution. While other sessions did not succeed technologically, and the use of "advanced" technologies like CU-SeeMe, in fact ,got in the way of some of our communications (it would have been far easier to arrange a call with speaker phones between sites), we all learned firsthand about the actual limitations of these technologies. When glitches frustrated us, we commented to each other, "If this stuff is so hard for us to use, how can we expect teachers to work with it in the chaos of the classroom?" But, in learning important lessons in technology humility, we also saw the potential for the future. Without the simultaneous translations, we could never have had a joint international conference. And without the video link, we couldn't have felt this "togetherness " in our shared goals of improving education. We slow and clunky adults stumbled along on the technologi-

cal path that our students will dash along in the coming years. For their sake, we had to try. And judging from the enthusiastic response, our somewhat awkward attempts were valued. The path will be much less rocky for those who follow.

Who wants to join me next year in Mexico City *and* Austin?

Endnotes

1. The Tampa panel, chaired by Chuck Lynd (Ohio State University), comprised Beverly Hunter (Bolt, Beranek and Newman), Al Rogers (Global SchoolNet Foundation), Chris Dede (George Mason University and the National Science Foundation), and Jim Bosco (Western Michigan University). The Monterrey, Mexico, panel, which I chaired, was composed of Margaret Reil (InterLearn), Luis Osin (Center of Technology in Education, Israel), and Jose Manuel Alvarez Manilla (Universidad Nacional Autonoma de Mexico).
2. The U.S. Department of Education had also commissioned a series of white papers on "The Future of Networked Technologies for Learning." They can be found at http://www.ed.gov/Technology/Futures/toc.html.

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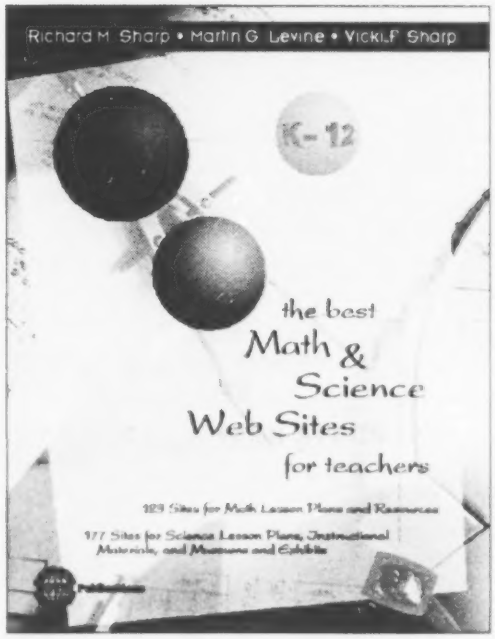

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Richard M. Sharp, Martin G. Levine, and Vicki F. Sharp
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NewsBits

edited by Gleason Sackman

The following Internet sites—World Wide Web, Telnet, newsgroups, and so on—may prove of particular interest to *T.I.E. News* readers.

SchoolWorld (http://www.schoolworld.asn.au)

This free Internet education site designed by teachers for teachers. Features programs, projects, keypals, resources, competitions, and a display medium for student work and products.

Science Web Sites

Astronomy and Space

- AstroWeb
  http://fits.cv.nrao.edu/www/astronomy.html
- Comet Hale-Bopp
  http://encke.jpl.nasa.gov/hale_bopp_info.html
- Galileo Probe
  http://ccf.arc.nasa.gov/galileo_probe/
- Kennedy Space Center
  http://www.ksc.nasa.gov/KSC.html
- Miscellaneous Web Sites
  http://128.165.1.1/solarsys/
  http://www.windows.umich.edu
  http://nervm.nerdc.ufl.edu/~cohenba/#resources
  http://ceps.nasm.edu:2020.homepage.html
  http://www.ari.net/back2moon.html
- MIT Subnode Homepage
  http://delcano.mit.edu/
- NASA
  http://www.nasa.gov
  http://sdcd.gsfc.nasa.gov/ESD/index.html
  http://shuttle.nasa.gov
  http://www.jsc.nasa.gov/nasa/Cool.html
  http://www.gsfc.nasa.gov/NASA_homepage.html
  http://spacelink.msfc.nasa.gov/
  http://liftoff.msfc.nasa.gov
- NASA Langley Research Center
  http://mosaic.larc.nasa.gov/nasaonline/nasaonline.html
- Planetary Datasystems
  http://pds.jpl.nasa.gov/planets/
- Project Galileo: Bringing Jupiter to Earth
  http://www.jpl.nasa.gov/galileo/index.html
- SETI Institute
  http://www.seti-inst.edu/
- Space Hotlist
  http://www.osf.hq.nasa.gov/hotlist/
- Space Telescope Science Institute
  http://www.stsci.edu/EPA/Subject.html
  http://www.stsci.edu/EPA/Latest.html
- Space Theater-Planetarium
  http://ucsu.colorado.edu/~peterscc/Home.html
- WWW Hot Topics
  http://129.212.11.3/internet/events/51-pegasus.html

Gopher Sites

- Electronic Bookshelf
  psulias.psu.edu
- NASA
  gopher.gsfc.nasa.gov
- Space Telescope
  stsci.edu
- Wiretap Online Library
  wiretap.spies.com

Newsgroups

alt.sci.planetary
bit.listserv.seds-l
bit.listserv.sedsnews
clari.tw.space
rec.radio.amateur.space
sci.astro
sci.astro.amateur
sci.astro.firs
sci.astro.hubble
sci.astro.planetarium
sci.astro.research
sci.space
sci.space.news
sci.space.shuttle
talk.politics.space

Telnet Sites

- Environet
  envnet.gsfc.nasa.gov
  (login: envnet, password: henniker)
- European Space Agency
  esrin.esa.it
- Lunar and Planetary Institute
  lpi.jsc.nasa.gov, login: lpi
- NASA
  spacelink.msfc.nasa.gov
- NASA Earth Systems Data Directory
  nodc.nodc.noaa.gov, login: noaadir
- NASA Equivalent in Japan
  nsaeoc.eoc.nasda.go.jp, login: nasdadir
- NASA Extragalactic Database
  ned.ipac.caltech.edu, login: ned
- NSSDC Online Data and Information Service
  nssdc.gsfc.nasa.gov, login: nodis
- University of Massachusetts
  spacemet.phast.umass.edu

Web Education Calendar Links

- Media Designs
  http://home.earthlink.net/~mediadesigns/Index.html
  Media Designs' Web Education Calendar features significant dates and events in history and includes hypertext links to related sites on the Web for each citation. This free service is updated monthly.

Native American and Related Resource Sites

- Custer Battlefield Museum and Historical Association
  http://www.tntmedia.com/custer
  This official site contains histories of the battles, biographies of key individuals, and information on touring the area and visiting the battlefield.
- Nebraska Native Americans
  http://www.ded.state.ne.us/tourism/report/native.html
- Red Cloud
  http://www.ilhawaii.net/~stony/redcloud.html
  This page includes a picture of Red Cloud and the text of his farewell address to his people.
- Native American Indian Pow Wow
  http://www.fdl.cc.mn.us/fdltcc/guest/spirit
- Miscellaneous
  http://www.pitt.edu/~lmitten/indians.html
  http://hanksville.phast.umass.edu/misc/naresources.html
  http://www.wvlc.wvnet.edu/wvarl/archp.html
  http://web.maxwell.syr.edu/nativeweb/biblio/brock.html
  http://www.si.edu/nmai/nav.htm
  http://www.intac.com/~jrt/classlinks/native.htm
  http://www.ilhawaii.net/~stony/nativelk.html
  http://www.cowboy.net/cgi-bin/people/Native/WebEvent/WebEvent/
  http://www.interport.net/~logomanc/heye.html
  http://hanksville.phast.umass.edu/misc/Aresources.html
  http://www.primenet.com/~eaglerg/
  http://one-web.org/oneida/
  http://home.earthlink.net/~wolfgang

Education

- Remedia Online
  http://www.rempub.com
  This K-12 education site offers discussion groups, pen pal connection, and an online catalog of more than 600 educational book for children.

Reference Sites

- Almanac of American Politics
  http://politicsusa.com/PoliticsUSA/resources/almanac/
- Alternative Dictionaries
  http://www.notam.uio.no/~hcholm/altlang/
- Center for Applied Special Technology (CAST)
  http://www.cast.org
  This nonprofit organization, based in Peabody, Massachusetts, works to improve education for all students, especially those with disabilities, by combining software development, teacher training, and student evaluations.

- Classroom Connect
  http://www.classroom.net/classroom/CitingNetResources.html
  This site is a good way to teach students how to use and cite Internet sources of information in their work, especially bibliographies.
- CyberBee and MultiMedia Schools
  http://www.cyberbee.com
  A new column in MultiMedia Schools magazine, this venture is designed to help teachers integrate Internet resources into their classrooms.
- Education World™ Search Engine
  http://www.education-world.com
  This free and powerful search engine focuses on providing information to educators, students, and parents. Users can perform keyword searches, browse by category, or join the Educators' Forum, a message board that facilitates dialogue between and among educators around the globe. Twenty education site reviews are posted each month.
- Global Campus
  http://www.csulb.edu/gc/
  This collaborative multimedia database contains a variety of educational materials such as images, sounds, text and video that can be used for nonprofit, educational purposes. The project's goal is to share resources through technology by providing a central World Wide Web "campus" where institutions can make their resources available.
- Global SchoolNet Web Pages
  The following GSN links are of particular interest.

  CU-SeeMe Schools Directory
  http://www.gsn.org/gsn/cuseeme.schools.info.html
  This comprehensive list describes K-12 schools around the world that can participate in CU-SeeMe videoconferencing. An archive of events in which schools can participate also is offered.

  Educator's ToolKit Updates
  http://www.eagle.ca/~matink/

  Educators' Web Contest
  http://www.gsn.org/gsn/www.contest.html
  This page describes a monthly Web contest for teachers and students; free software and instructional materials are offered as rewards.
- Free Teacher Help Service
  http://www.learner.org/k12/sami
  This site, offered by , the Annenberg/CPB Math and Science Project, provides assistance on finding lesson plans, projects, funding, and freebies (including equipment). It also can provide answers to questions about classrom Internet use. Fourteen Web-experienced K-12 teachers from all over the United States are available for help. The site is loaded with resources for any educator and updated daily.
- Global SchoolNet Foundation Support Services / Global Schoolhouse Project
  http://www.gsn.org
  The Global Schoolhouse provides participants with opportunities for lifelong learning. In this virtual meeting place, people of all ages and backgrounds collaborate, interact, and develop, publish, and discover resources.
- Global SchoolNet Internet Projects Registry
  http://www.gsn.org/gsn/gsn.projects.registry.html
  This is a central place to find partners and projects on the Internet; organized by month projects begin.
- Grolier Interactive
  http://www.grolier.com/gi.html
- International Newspapers Online
  http://webvisions.com.sg/inkpot/news/
  This new site contains pointers to more than 400 international newspapers, categorized by country.
- InterNIC/LITA 15-Minute Series
  http://rs.internic.net/nic-support/15min/
  The InterNIC and the Library and Information Technology Association (LITA), a division of the American Library Association, offer the "15-Minute Series," a collection of free, modular, and extensible training materials for the research and education communities. The training modules are available in both Microsoft PowerPoint and HTML and offer short slide shows on specific Internet topics. Trainers can extend the modules to address specific local issues such as operating platforms, client software, and access methods. Twenty-one are currently available and incorporate graphics, screen shots, and analogies. PowerPoint modules are also available by anonymous FTP: ftp://rs.internic.net/NIC-support/15min/

- K-12 Opportunities
  http://www.gsn.org/gsn/k12opps.html
  This page is a central posting location for announcements about free software, contests, conferences, training opportunities, and educational Web sites.
- Life Science Dictionary
  http://biotech.chem.indiana.edu/pages/dictionary.html
  This searchable illustrated glossary contains more than 3,700 terms used in biochemistry, biotechnology, botany, cellular biology, chemistry, ecology, genetics, medicine, pharmacology and toxicology.
- Merriam-Webster's Collegiate Dictionary
  http://www.m-w.com
- National Museum of Natural History
  http://nmnhwww.si.edu/nmnhweb.html
  This site offers documents and data about museum research and its national collections of more than 120 million scientific specimens and cultural artifacts from around the world.
- B. J. Pinchbeck's Homework Helper
  http://tristate.pgh.net/~pinch13
  This site provides links to more than 240 relevant sites around the world. A comprehensive search engine and reference section are included, allowing userd to find information about virtually anything on the Internet. Subjects related to English, history, math, science, social studies, and foreign languages are plentiful. The site has received numerous awards in its two years on the Web and can be used to train teachers, guidance counselors, and parents about the merits of quality educational sites on the Internet. It offers an excellent way for students to research and explore topics assigned by their teachers.
- School News
  http://dlcwest.com/~wmp/SchoolNews/snindex.html
- Special Needs Education Network (SNE)
  http://schoolnet2.carleton.ca/sne/
  This site shows Internet services specifically for parents, teachers, schools, and other professionals, individuals, groups, and organizations who are involved in the education of students with special needs.
- Student Home Page Directory
  http://studentcenter.infomall.org/homepages
- TV-Free Activities For Parents and Children
  http://family.starwave.com/funstuff/activity/tvtoc.html
  This site provides ideas for parent-and-child cooperative activities, including: arts and crafts, fantasy play, group play, indoor and outdoor play, math and numbers, science, toymaking, and words and language.
- World Kids Network™
  http://worldkids.net/
  At this new interactive site, kids set the standard and the pace. The site is run by children worldwide, through sponsorship of World Kids Network, Inc. Teachers, educators, entire classrooms and schools are welcome and encouraged to become involved.
- Y'Know
  http://rs.internic.net/scout/yknow/
  This new publication is being produced by K-12 students as a resource for other K-12 students and is an ongoing, cooperative effort between two classrooms in the Madison, Wisconsin, and two classrooms in Boulder, Colorado. Teachers assist and provide support, but the students select and annotate all resources listed in each issue. The publication is supported by Net Scout Services.

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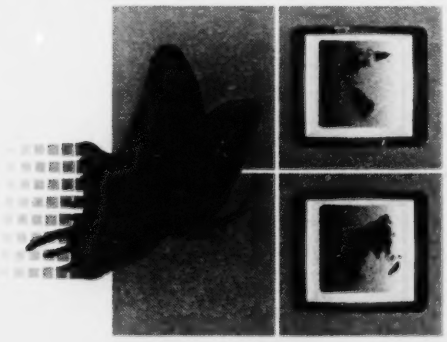

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Manuscripts should be sent via e-mail as file attachments (Word or WordPerfect preferred). ASCII text in e-mail messages will also be accepted if attachments are not possible. Submissions sent ny land mail should be sent on 3.5" Macintosh or DOS/Windows diskette.

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Open Call

Contributors are welcome to submit articles to *T.I.E. News* on any topic related to telecommunications in education. Because T.I.E. is a reflection of field-based activity that embraces novice and expert alike, we accept a wide range of material, from anecdotal reports of current projects to scholarly research.

Theme Issues

T.I.E. News will post calls for articles on particular themes in this space each issue.

For more information on submitting to *T.I.E. News*, please refer to "Submission of Manuscripts" in the first column on this page.

GREAT STUDENT PROJECTS
Deadline: August 15

Here's a call for online educators who have created, participated in, or marveled at the impact student projects have had on learning. Descriptions of projects created by teachers (or other adults) are welcome, of course, as are projects actually created or operated by students. Accordingly, *T.I.E. News* invites contributors to encourage and promote the participation of students in papers prepared for this call. Coauthored submissions are also welcome.

A DOCTOR IN THE HOUSE
Deadline: November 15

Many online educators have been learning about the impact of our work on both our own and our students' health. Sometimes online programs link constituencies in care facilities with others who share experience or interest in common concerns. Sometimes we are affected physically or emotionally by our own engagement in online work. In this call, *T.I.E. News* invites articles about how our work affects our health, and what people have learned about dealing with these issues. Our readers are encouraged to invite submissions from our colleagues in the health sector. Of course, coauthored submissions are also welcome.

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T.I.E.

Telecommunications in Education News

Volume 8 Number 4 August 1997

Learning by Doing: Online Teacher Training

By Alexei Dovgiallo, Valentina Kolos, and Svetlana Kudrjavtseva

Technology Helps Educators Network, Research, and Complete Their Doctorates

by Shelly M. Dorn and Rosemary Papalewis

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ALSO THIS ISSUE:

- **HELPING STUDENTS DESIGN WEB DOCUMENTS**
- **AUTHOR AND SUBJECT INDEXES, VOLUME 8**

T.I.E. News Volume 8 Number 4

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T.I.E. News solicits articles on all aspects of educational telecommunications. See the back cover of this issue for submission guidelines. Opinions expressed in this publication are those of the authors and do not necessarily represent or reflect the official policy of ISTE.

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Editor's Message

Trevor Owen

Coming Soon: SIG/Tel's *Journal of Online Learning*

The first issue of *T.I.E. News* (yes, I own a copy) was published early in 1990. Its goal was to serve as a kind of newsletter, keeping members of the newly formed SIG/Tel in touch with one another in the new field of telecommunications in education.

Over the years, it is clear that *T.I.E.* has done this, but it is also clear that our emphasis has shifted somewhat from an understanding of our work as having to do with telecommunications, or its role in education, to something more properly associated with learning.

Accordingly, I am very pleased, indeed, to let you know that our publication has been redesigned. Beginning with the next issue—the first of volume nine—it will appear as SIG/Tel's *Journal of Online Learning*.

The Last *T.I.E.?*

So, is this the last *T.I.E.?*

Well, not quite. *Telecommunications in Education News* will be incorporated into the new journal, retaining its original place as a newsletter by providing news from the field, particularly in the form of articles published online. I am especially pleased to report that Gwen Solomon will serve as the Associate Editor responsible for the "T.I.E. News" section within the journal, and that ongoing favourites such as Gleason Sackman's "NewsBits" will appear there.

T.I.E. News Index—Volume 8

In the last issue, we ran a complete index for *T.I.E. News*, volumes 1 through 7. In this, the last issue of volume 8, *T.I.E.* is running an index of all articles that have appeared over the past year. You will find two listings, one by author and the other by subject, all ably compiled by Jennifer Roland and S.M. Summerlight.

Associate Editors Wanted

Also in the last issue, I noted how *T.I.E. News* has benefited from the service of an interested (and interesting!) group of Associate Editors, and that we were looking for more. I would like to reissue this invitation and ask those who may be interested in serving as an Associate Editor of the new *Journal of Online Learning* to contact me (e-mail: tie@edu.yorku.ca).

In particular, I am looking for Associate Editors from a wide group of international educators, providing our readers with perspectives from individuals who can report on interesting initiatives in their countries, and who are interested in contributing an article each year, nurturing new authors, or both. I am also interested in hearing from people who have an idea for a useful series and who would take on the role of developing it for our readers.

This Issue

In this issue, the World Wide Web provides a focus for works from the Ukraine and the United States.

Alexi Dovgiallo, Valentina Kolo, and Svetlana Kudrjavvtseva send along work presented at the Telecommunications in Education and Training conference, which was held this past May at Charles University in Prague, the Czech Republic. Their focus is on distance education course design for teacher training.

Shelly M. Dorn and Rosemary Papalewis describe their work in helping doctoral students at California State University—Fresno network, research, and complete their studies.

T.I.E. News is also pleased to reprint an article from *HyperNexus*, a companion ISTE publication. In their article "Helping Students Design World Wide Web Documents," Elizabeth Boling and Sonny Kirkley, of the School of Education at Indiana University, focus on planning and designing student Web sites. Part II will appear in the next issue.

And Greg Collins, who begins his first year of teaching this fall, reviews *News Kids on the Net*, by Sheryl Burgstahler.

In closing, I would like to acknowledge the work that Steven Summerlight has put into the journal's redesign over these past few months, and to offer my thanks to him for his efforts.

Cheers, Trevor

President's Message

Chuck Lynd

NECC '97 in Seattle was a great success! The preconference workshop sponsored by SIGTel, "Dancin' on the Net: Introduction to Networked Learning in the Classroom," got rave reviews, and plans are underway to offer more workshops at Tel•Ed/Multimedia in Austin and NECC '98 in San Diego. Kudos to SIGTel board members Bill Burrall and Buddy Burniske for their leadership and skill in helping teachers learn how to integrate telecommunications into the curriculum.

Five of our Telecomputing Activity Plan contest winners presented at the SIGTel Society Session at NECC. Attendance was excellent and seems to grow every year. This session has earned a well-deserved reputation for providing teachers with inspiring examples of network learning projects along with the practical, down-to-earth details that classroom teachers appreciate. SIGTel contest winners represent the very best practices in schools today, and their stories are often featured in local community newspapers. Look for an article about recent SIGTel contest winners in the September issue of Media & Methods magazine.

As usual, NECC presenters' work displayed all of the latest trends among technology-using educators, but the World Wide Web continues to make telecommunications and the Internet a major priority for schools. One of the hottest trends in the already overheated Web is the addition of computer-conferencing options at many of our favorite Web sites. If you spend much time online, chances are you have already noticed this trend and perhaps even received a "push" message inviting you to sign up and participate in a discussion or debate a hot topic at a Web site for teachers.

Push? That's the latest jargon for e-mail that is mailed to you from a Web site to inform you about some new item or feature to entice you to visit. For example, Davidson and Associates unveiled EduCast at NECC, a new Web-based service for teachers that uses push technology to bring the latest news and resource information to the in-box of your e-mail client. The free service taps into key education Web sites, clips the latest information, and then formats it into channels that can be downloaded regularly. It looks like an excellent way to keep current and save some of that most precious resource of all—our time!

But back to the conferencing trend. Web masters are under pressure to retain visitors and keep people coming back. Building a sense of identification or "community" among those who share a common interest in the Web site is a key strategy that may change the way we interact and communicate on the World Wide Web.

The Web began as a new medium for publishing and distributing information. Its point-and-click interface helped turn millions of people into explorers who in turn fueled the explosive growth of Web sites. But such exploring or browsing uses the new online medium in much the same way that someone might do TV channel surfing. Those of us who were online before the Web remember a decade of computer-conferencing software developed first on bulletin boards and then on commercial services such as America Online, CompuServe, and Prodigy. The dream has been and continues to be to connect people and build online communities based on common interests. Why not combine the popular Web environment with computer conferencing and get the best of both worlds?

Technically, it is not quite as easy as it sounds to house conference rooms on the Web. When you log on to a BBS or an online service, you connect directly to a computer that continuously monitors your interactions. By contrast, Web sites wait until users issue a command but otherwise ignore your presence. Andy Dwyer, a Web master and consultant for an Ohio-based consortium of school districts, compares the traditional online experience with going to a full service restaurant, where the waitperson is always there to serve your needs. Visiting a Web site, however, is more like going to a cafeteria, where you are served piecemeal and get attention only when you browse and select individual items.

The good news is that these technical problems are being solved, and a new generation of HTML-based e-mail and conferencing software is on the way. The goal is to allow users to access any Web site, move seamlessly into a conference area or chat room, and then send and receive e-mail using a single browser client. The new programs promise to stimulate a building boom of new construction on the Web that will create thousands of small- and medium-sized communities that are organized around topical interests and themes.

For educators, this trend promises to enrich the experience of teachers and students as well as parents and community members who have begun to communicate online. Web sites will not only serve as a source for displaying student work and publishing information about school programs, but also offer new opportunities for public dialogue and discussion. The issue of equity and access to the Internet will come to the fore as even small communities begin to realize that the benefits of online conferencing must not be limited just to those who can afford it.

For SIGTel, I hope this trend will make it possible in the near future for us to improve our support for teachers by offering discussion, technical assistance, and even training opportunities through our Web site: http://www.ital.utexas.edu/related/eped/sigtel/. Our SIGTel listserv is a useful resource at present (find it at http://www.iste.org), but the integration of multiple functions within the common Web-browsing clients promises to make collaboration with our colleagues a routine part of access to resources on the Web.

This will be my last column as president of the SIGTel these past two years. I look forward to my new role as "past president" because I will be working with my good friend and colleague, Betsy Frederick, a veteran SIGTel board member and our new SIGTel president. And thanks to this wonderful Internet, I will remain in touch with many of you.

See you online!

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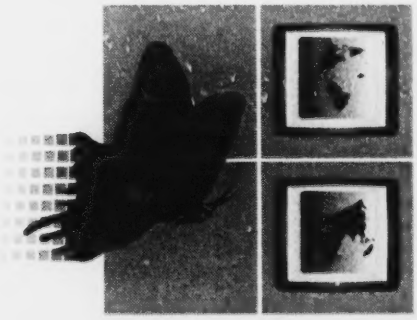

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Learning by Doing:
Online Teacher Training

by Alexei Dovgiallo, Valentina Kolos, and Svetlana Kudrjavtseva

Abstract
In this paper we describe the instructional telecommunication model that has been implemented in the first World Wide Web-based distance learning course for teacher training in Ukraine (http://www.dlab.kiev.ua/cit/tea_mod.htm). This course focuses on how to use the Internet for effective teaching and how to design and implement Internet-based distance courses for teachers. We describe the model that has been implemented in the course as "learning-by-doing activities." In our case, the model incorporates fundamental elements of the instructional design process, including analysis of the intended audience or determining aims and objectives as specific elements connected with using telecommunications for teacher training. The training in this course is organized into step-by-step activities in the learners' own distance course creation: The learners plan learning materials for future courses, select the media to be used in distance course planning, and consider pedagogical aspects of distance course design and the technologies they can use for it.

General Description
Instructional telecommunications models stay at the edge of education, but they must become a key to the future value of using telematics for teacher training. Telematics brings new learning possibilities to traditional education by providing either learning to a wide audience at a distance or new instructional telecommunication models in a more flexible and open way. Creating open learning environments using different instructional telecommunication models is a challenge to traditional education systems.

Nowadays one can formulate the next generalized conception of new approaches to education and training. Instructional telecommunication models will be used within telematics-based teacher training to grow communities of lifelong learners: student teachers, practising teachers, and teacher educators.

The first Web-based distance course for teacher training in Ukraine has been developed at the International Research and Training Centre UNESCO/IIP (http: www.dlab.kiev.ua/cit/tea_mod.htm). The course focuses on how to use telematics for extensive and effective teacher training and how to design and implement Internet-based distance courses by teachers.

The course results from work undertaken by a group of researchers and experts from Kiev. The work used Western technologies and drew from the experience of an international team of specialists from the University of Twente (Netherlands), the University of Exeter (United Kingdom), the University of Sofia (Bulgaria), and Kaunas University of Technology (Lithuania). The development of the CIT course was supported by the European Commission Directorate General XIII's Copernicus'94—Joint Research Project 1445, "Flexible and Distance Learning Through Telematic Networks."

Learning-by-doing activities constitute the instructional telecommunications model used in the course. We have chosen such a model in our online distance course for teacher training because Ukraine is just beginning to experiment with telematics applications for teacher training. We believe that using this model within traditional education will improve beginning and ongoing professional development of teachers and encourage and support a European dimension to education.

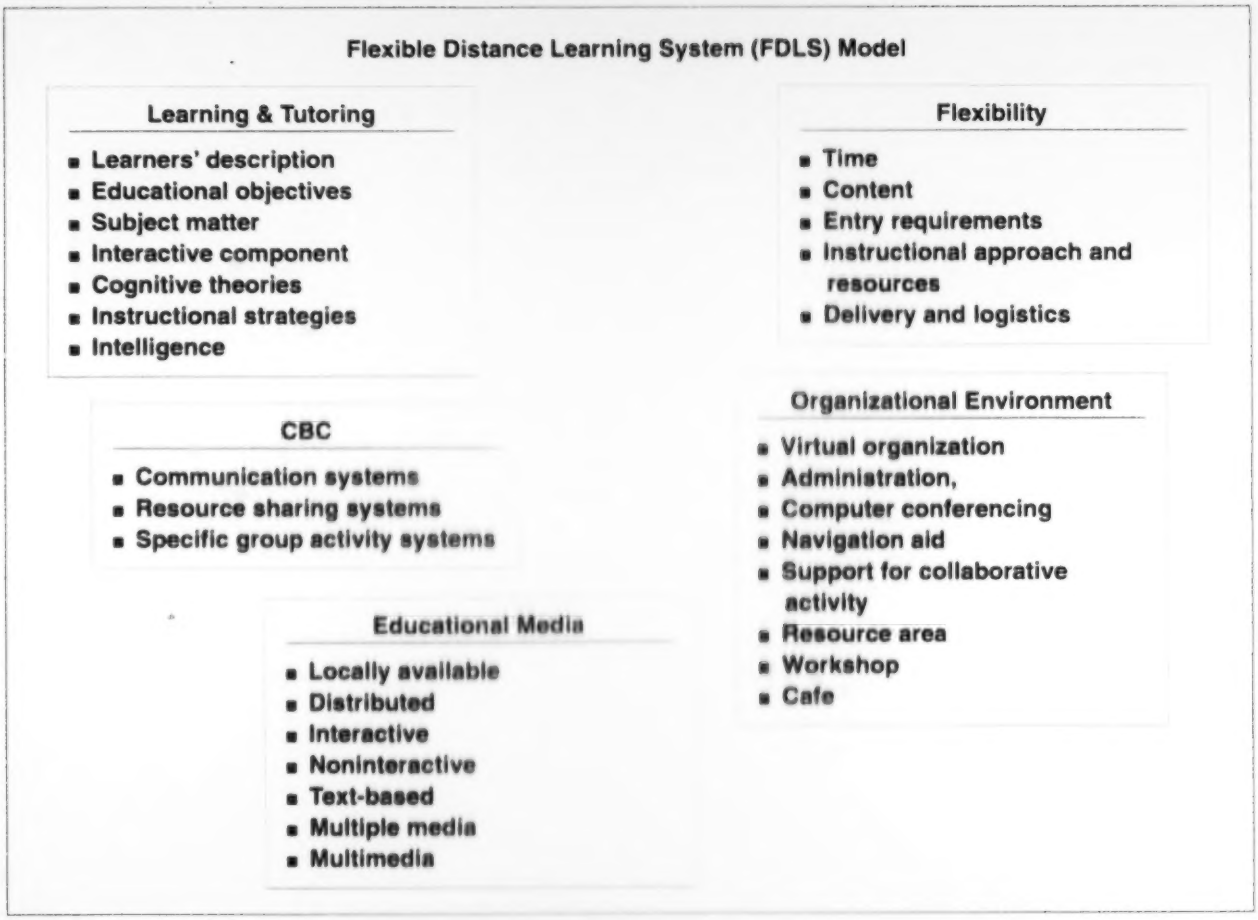

Figure 1

Creating FDLS Models

Teacher training in distance course design and development is based on the flexible distance learning system (FDLS) model. Our own distance course will be developed during the course. The general description of the FDLS model is presented in Figure 1.

The chosen instructional model—learning-by-doing activities—provides step-by-step distance course creation. In other words, each step allows learners to create activities during course design and development.

During the course, learners acquire knowledge and skills in preparing and using educational materials, including skills in providing feedback in a distance learning context and how learning styles and organizational environments can be used to enhance learning. They also learn which media will best serve their learning goals.

Below we describe how our learners use different instructional strategies during distance course design and development (in our case, the learners are educators, and the tutor is a teacher of online distance courses for teacher training).

Distance Course Design and Development Within the Online Course for Teacher Training

Before they start their own step-by-step development of a distance course, the educators have to select the appropriate technology for distance course design and development.

Step 1 Technological Issues in Distance Course Development

Activity 1.1 Technology selection for course development. To produce this activity for distance course creation, we propose to apply the "case study" instructional strategy.

In online distance courses for teacher training, this strategy within Activity 1.1. is realized by:

- educators making decisions about the distance course creation technology to be used, and
- course tutors preparing a Web page that consists of the most interesting answers.

Activity 1.2 Discussion of the FDLS model structure

To produce this activity for distance course creation, we propose to apply the "group discussion" instructional strategy like this: "We would like to remind you that we are creating a flexible distance course. So we propose to consider and discuss the flexible distance learning system (FDLS) model before we start course creation."

Educators have done the first step of distance course design. After this, they will know:

- different approaches to distance course development,
- what flexible learning is, and
- the components of the flexible distance learning system model.

Step 2 Distance Course Planning

This also includes development of the FDLS model for our distance course from the learning and tutoring component.

Activity 2.1 Describe the learners

To produce this activity for distance course creation, we propose to apply the "case study" instructional strategy. Within Activity 2.1, this strategy is realized by:

- decision making by educators concerning the target group (the audience the distance course is created for),
- careful thinking by educators about what skills learners need before they can begin to learn the course material, and
- evaluating whether these skills are in line with the chosen target group.

Activity 2.2 Aims and objectives

To produce this activity for distance course creation, we propose to apply the "case study" instructional strategy as follows. "Now we are turning to other things: aims and objectives (i.e., the 'educational objectives' parameter of the learning and tutoring component from the FDLS model). In this activity, we have to write aims and objectives for our course."

The strategy within Activity 2.2 is realized by:

- the educator describing his or her aims as a general statement of either what the learner might learn or what the distance tutor will do;
- describing *objectives* as a more specific statement about what the learner will be able to do (or do better) as a result.

Activity 2.3 Subject and sequence the content

To produce this activity for distance course creation, we propose to apply the "case study" instructional strategy like this: "We are continuing elaboration of the FDLS model for the course. The next parameter is "subject matter" in the learning and tutoring component. We have to determine subject and sequence the content."

This strategy within Activity 2.3. is realized by:

- making a list or drawing a map of the main topics that must be dealt with in the course materials;
- discussing contents lists or maps with colleagues, subject experts, and, if possible, some learners;
- amending the list as necessary in light of the discussion;
- taking the final objective for the lesson and writing it on the top of the page and then asking the question, "What skills and knowledge do my target group need in order to do this?"; the answer will go on the next level of your pyramid and so on; and
- drawing a pyramid analysis based on the final objectives of the distance course.

The second step of distance course design and development has been done by the educators. After doing this step, they will be able to describe:

- the learners' profile developed for the distance education course,
- the aims and objectives of the distance education course, and
- the content of the distance education course.

Step 3 Pedagogical Aspects of Distance Course Design

Activity 3.1 Learning style determination for our target audience

To produce this activity for distance course creation we propose to apply the "workshop" instructional strategy like this: "There are many different techniques

that each of us uses to learn, and different people use them in very different proportions. In our distance courses we are not limited by physical classroom restrictions, or by students having to pass exams. We have a variety of consultants each with their own styles—some will already have material, others will enjoy discussion, yet others may suggest and coordinate projects."

Within Activity 3.1, this strategy is realized by:

- learning the most important skills of the course learners, and
- deciding what learning styles are preferred for the target audience.

Activity 3.2 Pedagogical strategies or their combination for our distance course

To produce this activity for distance course creation we propose to apply the "workshop" instructional strategy like this: "This activity looks at the different technologies and telecommunication facilities from the tutors' points of view and describes different pedagogical strategies in flexible and distance learning. The pedagogical strategy is closely connected with the 'instructional strategy' in the 'learning and tutoring' component of the FDLS model."

This strategy within Activity 3.2 is realized by:

- selecting the most appropriate cognitive theory;
- building pedagogical strategies for learning process in the course, with respect to connections between instructional strategies to be used and media for implementation; and
- picking out the points in the learning process that can be improved because of evolving artificial intelligence tools.

Activity 3.3 Feedback in distance case (tests, tasks, activities)

To produce this activity for distance course creation we propose to apply the "simulation" instructional strategy like this: "One of the parameters of FDLS model is the 'interactive component.' Now we consider how we can organize interaction during distance course design. This component is important during implementation activities, tasks and tests."

Within Activity 3.3, this strategy is realized by:

- organizing different kinds of activities for individual and group work, and
- planning learners' testing.

Activity 3.4 Ways of providing support

To produce this activity for distance course creation we propose to apply the "workshop" instructional strategy like this: "Distance learners often can work with packages of materials. However, the package is rarely enough. Unless the learners are supported by help from other human beings, they may not learn as much as you'd hope from your materials. Educators have to decide who might provide such support."

The "workshop" strategy within Activity 3.4 is realized by:

- making decisions about what kinds of support learners might need,
- choosing the people who offer the support, and
- noting the types and levels of support that educators will be able to assume course learners will get.

Educators have completed making the third step of distance course design. After this step, they would be able to explain briefly:

- the different distance learning styles,
- which pedagogical strategies are more suitable in their own case, and
- what kinds of feedback can be used in their distance course.

Step 4 Computer-Based Communication Technologies and Media Selection in Distance Course Planning

Activity 4.1 Computer-based communication technology selection

To produce this activity, we propose to apply the "case study" instructional strategy like this: "Now we shall build the CBC component for the FDLS model of our course. Carrying out this activity we have take into account all parameters of the model, elaborated above, namely 'learners' description,' 'educational objectives,' 'subject-matter,' 'interactive component,' and 'instructional strategy.'"

Within Activity 4.1, this strategy is realized by answering questions concerning how the learning process is developed:

1. What communication system do we prefer (synchronous or asynchronous)? If educators select the synchronous communication, then they must define a communication mode as one-to-one or one-to-many; in the latter case, they will have to choose a scale for

the chosen communication mode: one-to-one, one-to-many (delivered to individual address), one-to-many (stored in a central location), or many-to-many.

2. What resource sharing system do we intend to use in the course (synchronous or asynchronous)?

3. Do we intend to use specific group activity systems?

- browsing our own networking equipment and software?
- choosing appropriate CBC technologies (according to the course needs and networking equipment and software)?
- describing our selection? (Why are these technologies appropriated for the developed course?)

Activity 4.2 Choosing appropriate media

To produce this activity for distance course creation, we propose to apply the "simulation" instructional strategy like this: "Now we will elaborate on the 'educational media' component of the FDLS model for our distance course. These media have been selected as being relevant to the particular situation. In distance education, different media are required both to deliver materials and to make learning resources—e.g., personnel support—available."

The "simulation" strategy within Activity 4.2 is realized by making decisions about media selection: Which media will be physically available and most convenient to the course learners? Which media will educators be most comfortable with? Which media will learners already have the necessary skills to use? Which media will educators and the learners be able to afford to use?

Activity 4.3 Learning material creation for flexible distance course

To produce this activity for distance course creation, we propose to apply the "work project" instructional strategy like this: "We had elaborated the first three components of our course FDLS model ('learning and tutoring,' 'CBC, and 'educational media'), so we are ready to create learning materials for our distance course. In this activity, we are proposing methodological recommendations for the preparation of flexible distance course learning materials.

The "work project" strategy is realized within Activity 4.3 by:

- adapting useful materials to the distance case,
- deciding what educators have to give the students,
- making the learning material easy to read,
- deciding what the main components of learning material preparation are,
- making a global layout of distance course content,
- improving learning material for the distance course,
- focusing on the preparation of study guides, and
- preparing additional and more challenging learning material.

The fourth step of distance course design has been done by educators. After this step, they would be able to explain briefly:

- what computer-based communication technologies are available,
- what media are available in distance learning,
- how one can use more popular media such as e-mail and the World Wide Web for learning and teaching, and
- how to choose media for distance courses.

Step 5 Development and flexibility in distance course design

Activity 5.1 Flexibility level definition for your course

To produce this activity for distance course creation, we propose to apply the "group discussion" instructional strategy like this: "There are different instructional strategies for distance learning, specific features and facilities of flexible learning, principles of feedback organization, and methodologies of distance learning material creation. Now we shall consider the "flexibility" component of the FDLS model using group discussion of this subject."

Activity 5.2 Tutor's role definition for developing the course

To produce this activity for distance course creation, we propose to apply the "simulation" instructional Within Activity 5.2, this is realized by:

- defining team staff for distance course development,
- describing roles for each person on this team, and

Step 1 **Technological Issues in Distance Course Development**	**Activity 1.1 Technology selection for course development** **Activity 1.2 Discussion of the FDLS model structure**
Step 2 **Distance Course Planning**	**Activity 2.1 Describe the learners** **Activity 2.2 Aims and objectives** **Activity 2.3 Subject and sequence the content**
Step 3 **Pedagogical Aspects of Distance Course Design**	**Activity 3.1 Learning style determination for our target audience** **Activity 3.2 Pedagogical strategies or their combination for our distance course** **Activity 3.3 Feedback in distance case (tests, tasks, activities)** **Activity 3.4 Ways of providing support**
Step 4 **Computer-Based Communication Technologies and Media Selection in Distance Course Planning**	**Activity 4.1 Computer-based communication technology selection** **Activity 4.2 Choosing appropriate media** **Activity 4.3 Learning material creation for flexible distance course**
Step 5 **Development and Flexibility in Distance Course Design**	**Activity 5.1 Flexibility level definition for your course** **Activity 5.2 Tutor's role definition for developing the course** **Activity 5.3 Organizational environment design for your own distance course**
Step 6 **Web-Based Course Elaboration and Distance Course Evaluation**	**Activity 6.1 Web-based course elaboration** **Activity 6.2 Distance course evaluation**

Figure 2. Outline of the online course for teacher training

- answering the question, "Which member of the supporting team is responsible for learners' registration, assessment of text-based answers and preparation summary for all learners' answers, observation for course discussion and preparation summary of the discussion, prepa-

ration of Web pages, providing answers to learners most frequent questions, sending announcements, and so forth?"

Activity 5.3 Organizational environment design for your own distance course

To produce this activity for distance course creation, we propose to apply the "simulation" instructional strategy. Within Activity 5.3, this is realized by:

- deciding which organizational environment model the educators prefer, and
- describing computer conference areas for the distance course and their objectives with respect to team staff for course support and delivery.

Once the fifth step of distance course design has been done by educators, they will be able to know:

- tutors' responsibilities and activities during the course process
- specific features of monitoring and management of distance learning processes, and
- structuring principles of computer conferencing.

Step 6 Final Web-Based Course Elaboration and Distance Course Evaluation

Activity 6.1 Web-based course elaboration

To produce this activity for distance course creation, e propose to apply the "case study" instructional strategy. To carry out this activity, the educators have to elaborate:

- all text materials based on earlier selected media,
- all necessary tests and activities that have been designed to provide feedback, and
- corresponding Web pages that have been planned according to the learning process.

Activity 6.2 Distance course evaluation

To produce this activity for distance course creation, we propose to apply the "demonstration" instructional strategy. Educators receive information about different approaches that have been used for given distance course evaluations.

The "demonstration" strategy within Activity 6.2 is realized by:

- planing evaluation procedures for the distance course and sending the plan to the tutor,
- using the tutor's response to send educators' plans and course materials to people proposed by the tutor to evaluate the course, and
- evaluating the proposed course.

The online course for teacher training is outlined in Figure 2.

In summary, educators using learning-by-doing activities as their instructional telecommunications model have designed and developed their own distance course based on the FDLS model. The educators not only acquired new knowledge and skills but also used the knowledge in practice.

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Technology Helps Educators Network, Research, and Complete Their Doctorates

by Shelly M. Dorn and Rosemary Papalewis

To alleviate the stress caused by various career, education, family, and community roles that compete for their time and energy, educators must take advantage of electronic technology. This includes computers, electronic mail, Internet access, video-conferencing equipment, online research, and advanced software such as word-processing, database, and statistical programs. Such technology is essential to the students and faculty in the Joint Doctoral Program in Educational Leadership (JDPEL), which is a cooperative venture between California State University-Fresno and the University of California at Davis. JDPEL professors and students often communicate with each other through electronic mail, phone, and video conferencing because the scholar-practitioner students work full-time and attend courses during evenings and weekends at CSU Fresno, while the professors are found at eight different universities.

Convincing Educators to Welcome Technology

Electronic mail may have been the most powerful contrivance to convince educators that computers are "friendly," useful tools. This form of computer-assisted conversation, the convenience of portable computers, the flexibility of telecommuting, and the need to keep up with technology to be an educational leader has compelled many educational leaders to learn about and use technology (Yoder & Smith, 1995).

The scholar-practitioners at JDPEL who are earning their doctorates rely on communications technology to help with several tasks required for both their doctoral studies and their careers—such as researching, writing, and communicating. For some of them, the doctoral program was an introduction to the wonderful world of telecommuting. As one student expressed it,

> *Having five secretaries meant I never really had to touch a computer until four years ago when I began my doctoral studies. Suddenly I had to purchase a PC for home use, do papers, use an e-mail account and soon discovered the wonderful convenience of doing my research at home (an hour and a half from my college library). I found that I could have needed articles faxed to me and could keep in touch with the doctoral program office easily and when it was convenient for me. Due to the geographic locations of my committee members (UCLA, UC Santa Barbara, CSU Sacramento) my final defense was actually an interactive live teleconference from Fresno State with only me and the video camera and monitors!*

Advantages and Disadvantages of Electronic Technology

A study of female educators at JDPEL (Dorn & Papalewis, 1996) revealed favorable reactions to the effects of telecommuting on doctoral studies. The most prominently noted item was the students' increased ability to conduct research required for doctoral studies online, which saved commuting time, increased their access to research sources, and expanded their geographical reach. Several students noted the convenience of telecommuting and indicated that this made it possible for them to complete their doctoral

studies and meet their family commitments while working full-time in the field of education. Several students indicated that it would have been impossible for them to complete their doctoral studies without telecommuting. Others indicated that networking and communicating with professors and other students by electronic mail allowed them to stay connected and to access information. Most respondents agreed or strongly agreed with the advantages listed in the survey: increased productivity, less commuting, reduced stress, flexibility with location, quickly accessible information, flexible hours, and access to an enormous amount of information (Dorn & Papalewis, 1996).

One of the JDPEL students' few complaints about telecommuting is the resulting tendency to work too much because modems, fax machines, computers, and video-conferencing equipment make work possible anywhere and at any time. Struggling to keep up with technology is another common complaint. As one student said, "It is very easy to get lost in the wonderful possibilities of cyberspace—one is easily side-tracked by intriguing articles, Web sites, etc." (Dorn & Papalewis, 1996).

E-mail and online research offer an incredible amount of information. This is one advantage of electronic technology, but it can also present problems (Gleick, 1994). "Communication via the Internet is a powerful tool that permits instant dissemination and discussion of the latest educational research. But it is possible to get lost in the waves of information while 'surfing' the Internet" (Pierce, Blomeyer, & Roberts, 1995, p. 26).

Learning About Technology

Each JDPEL student enters the program and takes core courses as part of an intact cohort (of approximately 14 students) for at least the first year and one-half of the doctoral program. It was not effective to have only part of a cohort use electronic mail because the JDPEL's staff, faculty, and cohort members would have to communicate and distribute information by sending e-mail, faxes, or snail mail, depending on each student's preference. So after the first two cohorts passed through JDPEL, we had students sign a contract that required them to acquire a computer, a modem, and an e-mail account.

For some students, telecommuting became the only way that they could stay connected to colleagues or access needed information. Some of them adapted quickly to the technology and used programs to their fullest extent, soon wondering how they ever functioned without e-mail, the Internet, and so on. Those who welcomed the technology quickly found out about all of the extra features available through e-mail, such as sending and receiving documents as "attachments" so that word-processing formatting arrived intact. There were, of course, stubborn students who learned only the minimum needed to send and receive brief messages. They struggled with the need to use telecommuting tools. We have, however, been nicely surprised on occasion by a call or visit from a formerly technology-resistant student who finally welcomed the technology and wanted to let us know all the wonderful things he or she could do with e-mail, the Internet, and online research.

Many of the JDPEL students may have started the program with skepticism about learning and applying new technology, but through our immersion strategies they soon gained the experience they needed to take full advantage of the technology. The following lists the factors that encouraged busy educational leaders, who were enrolled as JDPEL doctoral students, to embrace technology:

1. A requirement of acceptance into JDPEL is the acquisition of a computer, modem, and e-mail account.
2. Independent studies and dissertation committees rely on electronic communications technology because dissertation committees are often made up of three professors and one student each in a different city in California (e.g., Sacramento, Fresno, Santa Barbara, and Davis).
3. Courses, committee meetings, and dissertation defenses often use interactive video equipment. This is partly because a professor may be in Los Angeles, while the students meet in Fresno; the process also facilitates ongoing discussion. JDPEL scholar-practitioners are expected to participate in ongoing e-mail discussions with professors and cohort members about readings, research questions, and so forth.
4. Professors who communicate consistently through e-mail are not easy to reach by phone.
5. Electronic mail has the power to eliminate "phone tag."

6. Because educational leaders work full-time and then attend doctoral classes in the evenings and on weekends, their libraries are often closed and professors are not available for research or discussion. Online research and e-mail are available at any hour.
7. JDPEL provides workshops and courses in areas of student need such as the use of online research, e-mail, and ERIC and DIALOG searches. Professors and research assistants make themselves available for any needed one-on-one training.

We have worked with the JDPEL students since 1991, from a first cohort that had never heard of e-mail, online research, or video-conferencing equipment, to the newest cohort in 1996, many of whose members came into the doctoral program already actively using telecommuting tools to facilitate their careers. The student use of Internet, personal video-conferencing equipment, and online research is likely to increase tremendously. The doctoral students will undoubtedly overcome most of their anxieties about new technology and use more and more features of e-mail, personal computers, and online research. This will occur when they realize that improvements in efficiency and networking will be worth the time they invest in learning the technology. The ultimate benefit will be to the educational institutions around the San Joaquin Valley that are within the JDPEL students' closest sphere of influence. As JDPEL students expand their use of these technology tools, so will their colleagues and students.

Many educators will put off learning new technologies because they are too busy, are happy with the way they do things, or think they are too old. (By the way, most JDPEL students are in their 40s or 50s.) Because JDPEL required its educator-scholars to learn how to use e-mail, online research, and video-conferencing equipment, these students had no choice but to adapt. Fortunately, many of them were glad they did, especially when they found they could do research at home, "talk" to their dissertation chairs from home by e-mail, and otherwise get work done during the hours they were not working at their school sites, which could just as well be 10 p.m. as 5 a.m.

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Helping Students Design World Wide Web Documents

by Elizabeth Boling and Sonny Kirkley

Editor's Note: *This is the first part of a two-part article that began a year ago in HyperNexus, Vol. 6, No. 4. The second part will appear in the premier volume of* ***Journal of Online Learning****, which will incorporate T.I.E. News and appear this fall.*

What are the primary design issues to consider in the process of authoring for the World Wide Web? During the 18 months before this article first appeared, the authors conducted multiple Web design workshops with K–12 teachers, school administrators, college faculty, and technical staff from schools. We also teach novice Web designers, develop Web documents and sites, and study the design guidelines emerging from the Web community itself. From all these sources, we have assembled a list of design issues that is evolving even as we write. In this article we present a snapshot of that list to assist authors who are just jumping "onto the Web."

"Part I: Planning and Designing the Site," in this issue, helps new developers get ready to publish on the Web. ("Part II: Designing and Maintaining the Pages," will appear in *Journal of Online Learning* Vol. 9, no. 1, and address the design of actual documents, or pages, for the Web; it will also include tips on making a Web site easier to maintain once it exists.)

Part I: Planning and Designing the Site

The relative ease with which students and teachers can author documents for the World Wide Web (WWW) is deceptive. It's very easy to "get a page up on the Web," but once we have created more than two documents linked together we either have to face some critical design decisions or we end up with a snarl of files and links that can take forever to straighten out and that confuse the people who visit the site in the meantime. Only a year ago teachers and students could publish in relative anonymity, confident that only a few people might be likely to visit their sites; with the advent of powerful indexing robots and search engines however, the tiniest site is likely to be visited far more often than one might suppose.

The Design Process

No matter how helpful a list of issues for design might be, it is difficult, if not impossible, to consider and respond to every item on such a list at the same time. The issues presented here are best understood within the framework of the process model in Figure 1. Our model takes the view that "design" consists of multiple interrelated components (e.g., content design and technical design) that are influenced by decisions regarding the goals for the Web documents. Evaluation occurs throughout the process, so that designers may find themselves moving up and down the model in response to the results of evaluation instead of moving through the model in a step-by-step fashion.

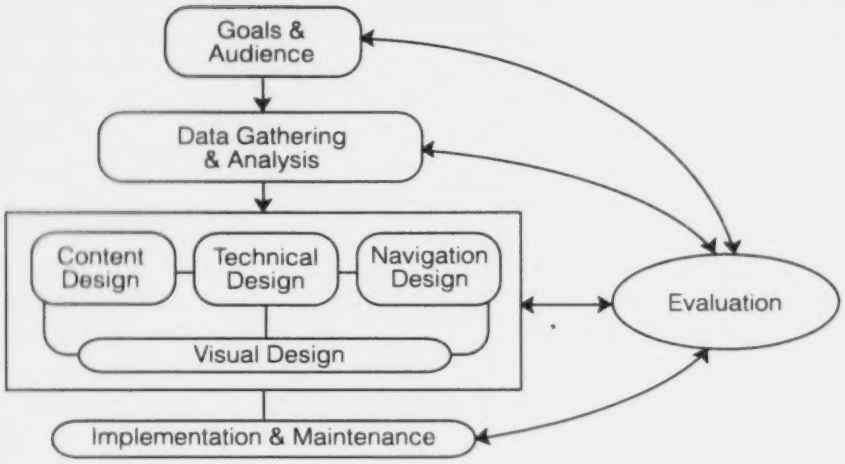


Figure 1

Novice designers, especially students, frequently approach a project from the middle of this model; for example, a student may respond positively to an existing Web site because of its "cool graphics" and decide to produce a site "just like that one." It's usually counterproductive to force a student back up to the top of the model, but we can ask students to make a simple analysis of the sites that have captured their interest, using the model to guide them. They can ask and answer the following basic questions.

- Who is the target audience for the site?
- What were the developers of the site trying to provide for that audience?

With the answers to these questions in hand, the students can determine which design elements they should mimic and which they should adjust to make a better match with their own purposes.

Goals and Audience

Define the Audience

Constituents. Students are frequently members of the primary audience for their own published material. They are usually insightful about the characteristics and needs of the student members in their audience. Other members of the primary audience for a classroom-based Web site might include teachers and students in other classrooms across the world, relatives of student developers, and professionals who are interacting with students via the Web in a particular content area (like creative writing). Collectively these audience members may be thought of as the constituents for the site, because it will be primarily for their needs and convenience that the site will be designed. Students need to recognize that their primary audience is probably broader than simply "other students like me," and they shouldn't forget that all Web developers have at least two other audiences: stakeholders and the rest of the world.

Stakeholders. Stakeholders are all of the people who may be directly affected by the existence of the documents within a site and those who might be in a position to affect what goes into those documents. Participants in our workshops usually identify stakeholders as school administrators, community members with an interest in the schools, anyone whose work is referenced or reproduced in the site, anyone whose picture or name is used in the site, and any technical support people who will be responsible for helping develop and maintain the site. Students may not realize what a large group of stakeholders they have and may not be eager to consider the wants and needs of stakeholders while they are designing. Bringing in several (enthusiastic) stakeholders to view early design efforts can build awareness and acceptance of stakeholders with students—and help build goodwill with the stakeholders too.

The Rest of the World. Participants in our latest workshop confirmed that even their brand new school-specific sites were being visited from literally all over the world and that they were finding themselves linked to central "lists of links" (like the Yahoo

directory). A brief search of the Web for "kids" or "students" will reveal multiple sites devoted to finding and publishing links to student Web documents. Although the prospect of a worldwide audience is exciting for novice Web developers, it brings along a responsibility most students have not yet had the opportunity to face—once published to the Web their work will represent of themselves, their schools, their communities, and even their countries in the eyes of a very wide audience.

Goals

Once they have seen the World Wide Web, many students have no trouble coming up with a goals statement (e.g., "I want to be on the Web!"). The following two questions can help students sharpen their goals for creating Web documents.

1. What will you put into your documents? (Do you have it? Will you have to make it? Collect it? Scan it?)
2. How will your audience use those documents?

Participants in the authors' workshops usually find it helpful to discuss these questions as a group because no one person ever seems to think of as many useful, "obvious" answers as the group can. Students will find their perspective similarly extended when they discuss design goals in a group.

Practical Data Gathering and Analysis

Goal setting is fine, but what if we simply don't know how people might use our documents or what information might be most useful to our audience? At this point a little practical data gathering is in order.

Interviews

Students identify representative constituents and stakeholders and conduct open-ended interviews with them to find out what their audience wants to see and how they might use the information. They should plan these interviews ahead of time, developing between 5 and 10 primary questions and some follow-up questions—the ones to ask in case the subject does not talk at length.

The questions will vary, but they should offer as much opportunity as possible for variety in the answers. The question "Which would you prefer to see on the Web—student art work or news articles by students?" will not yield as much helpful information from interview subjects as the question, "What type of student work do you usually enjoy seeing?" Follow-up questions for this one might be, "What do you enjoy about looking at that kind of work?" and, "When you look at that work, what else do you want to know about it?"

Analysis

When they have their data in hand, the students' next task is to organize that data so it can guide their design process. It's important to have the students look for patterns in the data rather than simply having them count up answers and try to make decisions based on numbers. Easy patterns to detect may be:

- Very similar answers to a question.
- Very different answers to a question.
- Surprising answers; the ones they didn't expect.
- Answers everyone expected to hear.
- Emotional answers ("I love to look at pictures" or "I really hate it when I can't find out when something was made").

The process of sorting answers into these kinds of patterns helps student designers become familiar with their audiences. Once the data are sorted, students can create 2 or 3 simple "characters" who are assembled by inference from the data. In a recent project one of the author's student teams created a character named "Desperate" who needed some information for use in a class, was liable to give up on the search very easily if it seemed too difficult, and was liable to do poorly in the class if he didn't find the right information. A second character, "Motivated," was mainly interested in technology, but would study information if it looked interesting and get impatient quickly if she didn't find something new to look at. The team used these contrasting characters throughout their design process to ask themselves whether their design decisions were going to "help Desperate" or "hinder Motivated." Creating characters helps students identify the relevant parts of the data they have collected, relate those data directly to their designs, and remember to apply the data throughout the process instead of collecting and then forgetting them.

Content Design

The decision to meet certain goals for certain users does not automatically take care of the content issues for a site. With their lists of proposed content in hand, student designers will need to address the ways in which that

content can be divided into pieces, or *chunks*; the way those chunks are connected, or *linked*; and whether or not some of the content should be included at all.

Chunking

How much content should go into a single Web document? Web users don't like to scroll through documents, but restricting each page to "a screenful" of content results in "chunks" of content that are so small the user has to do a lot of clicking to see anything very useful. It's a better idea to put related content together on a page and look for natural "break points" when the size of the document becomes difficult to edit or begins to take a long time to load when accessed through the Web.

Designers use two strategies for organizing information conveniently on a long page. The first is to ensure that even part of a line of text shows at the bottom of the page, as a clue that the whole document is not showing (test this on several different browsers). The second is to create a list of internal links at the top of the document that connect to locations further down in the same document instead of to a new document. Including a "back to the top" link makes it easy for a user to browse several sections of content without having to load a new document.

Linking

When a document is full of links, users have a hard time deciding which ones are going to be fruitful, so they may choose not to follow any—and once a user has linked away from a document, there is a real possibility she won't come back to it. In making decisions about links, student designers should refer back to the characters they invented during data analysis and ask themselves questions like, "Why would So-and-So follow this link? Would it be helpful for him? What if he never came back—would that be OK?" If they have to define the connection between one document and another in terms of the audience, students are likely to include meaningful links rather than frivolous ones.

Eliminating

What content should *not* be included in a Web site? Here are some examples:

1. Content that changes so frequently that maintaining currency takes more time or money than this organization or individual can afford. Are the students considering posting reviews of cafeteria meals every day? Who is going to be responsible for posting those reviews? If there are enough computers available to enough willing hands, such a design can work. Otherwise, it should be reconsidered.
2. Content that is urgent; people will need to see it right away and might miss it if the Web is the only place it appears. The Web does not automatically reach out and tell users that new information is there. If users don't browse the site on a regular basis, designers cannot presume that they are seeing newly published information right away.
3. Content that will bring unwanted attention to an individual or elicit many responses that must then be handled by someone in the organization. If users are invited to contact an expert whose name is given in a document or requested to send in comments about a site, someone will have to manage the resulting response. Students need to be aware of this issue and plan for the resources to manage whatever the consequences are.

Levels of Information

Balance is the key to making decisions about the number of levels a site should contain (see Figure 2) and what information should appear at each level.

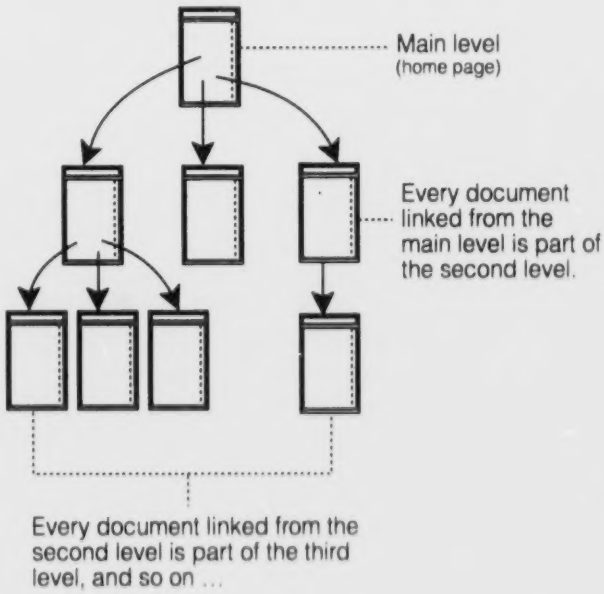


Figure 2

Photograph Release Form for Parents

The signature below indicates my permision for [name of school] to publish the photographic likeness of my child, [child's name], on the World Wide Web as part of the [name of project].

The photograph will be used as part of an educational project only and the document in which it is published will contain a notice prohibiting copying of the photographs contained in it.

The permission is valid as long as the original project remains published on the Web. This permission is only valid for the specific project named in this release form.

I have received a copy of this release form.

Signature _____

Address _____

Phone _____

Date _____

General Photograph Release Form

The signature below indicates my permision for my photographic likeness to be published on the World Wide Web as part of the [name of project].

The photograph will be used as part of an educational project only and the document in which it is published will contain a notice prohibiting copying of the photographs contained in it.

The permission is valid as long as the original project remains published on the Web. This permission is only valid for the specific project named in this release form.

I have received a copy of this release form.

Signature _____

Address _____

Phone _____

Date _____

Figure 3.

Ideally, users will be able to access as much of a site as possible from the main entry point, or what we have been calling the "main document." If this principle is followed too strictly, though, the main document can become an unwieldy list that isn't useful for anyone. On the other hand, creating a new level for every possible subdivision of content leaves users clicking on link after link without arriving at anything useful. The rule of thumb that seems to work is this: The users of the site should be able to decide within three links from the main document whether they are close to finding what they want. For sites that are getting fairly large, students can make index cards that represent their primary content elements and experiment with reorganizing the cards until they have satisfied the three-link rule.

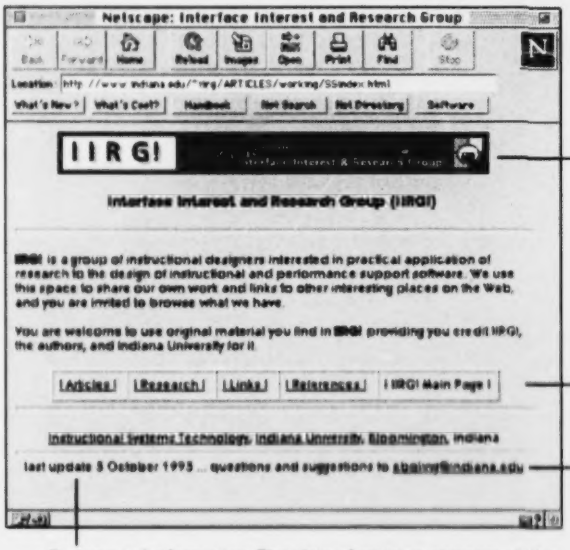
Source and Currency of Content

Copyright and Plagiarism. Some guidelines concerning the use of other people's content are the same for Web documents as they are for book reports and term papers. Unattributed quotations constitute plagiarism, period. Other rules are more strict than most regular classroom guidelines; for example, scanned images that are taken without permission from copyrighted sources may be included in a one-time, unpublished school report, but they are not acceptable for use in documents published to the Web because the Web is an international publishing medium. These rules are easy for students to forget when the technology makes it easy to copy text and graphics directly from screen and paper sources. Students *must* understand the serious implications of using material for which they do not own the rights. Think of creating Web documents as international publishing, and encourage students to do the same.

Personal Exposure. In addition to copyright issues, students should observe several cautions when they use photographic images in Web documents. First, create a release form (see Figure 3) and use it any time they include scanned photographs of people in their documents.

Second, obtain permission from students' parents or guardians before students put photographs of themselves (or full names, addresses, phone numbers, or other personal information) in their documents. The Web is a worldwide publishing medium and everyone has the right to refuse such exposure for themselves or their children.

Users need as much information as they can get about the source of the information they're getting from the Web; it is the responsibility of information providers to identify themselves as clearly as possible to users. This includes offering a contact name or e-mail address to which users may address questions concerning the content of a document. It is also important to indicate the last time a document was updated, so that users know how current the information in that document may be. All this information is frequently included in a standard



Visual identity symbol: This symbol appears on all the pages in this site.
Landmark graphic: This graphic appears on all the major access pages of this site.

Navigation bar: This bar appears at the bottom of every page in the site—the link to the current page is not active because we're already there.

Source of information: This link allows users to send electronic mail to the maintainer of the site.

Currency of information: The date of revision appears at the bottom of every dosument.

Figure 4.

footer for every document in a site. (Figure 4 shows standard header and footer elements.)

Resources on the Web

The Web itself offers many resources to designers, and students can become familiar with the primary issues by doing something they enjoy anyway—surfing the Web. The following list of URLs will help you target design-oriented resources.

Style Guides

http://info.med.yale.edu/caim/StyleManual_Top.HTML
This online manual describes the design principles used to create the pages within the Center for Advanced Instructional Media's (C/AIM) World Wide Web site. The manual includes a great explanation of the "whys" behind the principles.

http://www.indiana.edu/ ~ wwwdocs/guidelines.html
The Indiana University Bloomington Style Guide is a great example of minimal guidelines developed by a diverse community of Web designers. These standards are presented in an especially straightforward style.

http://www.ithaca.edu/web_admin/IP/ip_handbook/design.html
Ithaca College's online Information Provider's Handbook contains a very thorough Style Guide section. Some of the information there is, of course, specific to Ithaca, but the guide is a good example for site developers to follow and contains a lot of helpful guidelines.

http://www.wsdot.wa.gov/Webmaster/WebDesign/guide/
For a look at the guidelines for Web design published by a government organization, try the Washington State Department of Transportation.

http://www.np.sg:9080/html_design.html
Ngee Ann, a commercial Internet provider, publishes these straightforward guidelines for Web page design.

Search Tools

http://www.altavista.digital.com
You'll need a forms-capable browser to use this search facility (*Netscape*, *Mosaic*, and *LYNX* are all forms-capable). Enter one or several terms and get back a list of links from all over the Web. This is a good way to find out how visible your site is to everyone in the world!

http://www.yahoo.com/Education/K_12
Still one of the friendliest and most complete indexes on the Web, Yahoo maintains extensive lists of education-

related sites and actual school sites. From this K–12 page you can backtrack to all their education listings.

Resources for Web Developers in Education
http://cee.indiana.edu/surf.html
The Center for Excellence in Education (CEE) at Indiana University maintains a page of Web resources for educators that is used by the hundreds of educators who attend workshops in the Center every year.

http://cee.indiana.edu/workshops/design_server.html
Also in the Center for Excellence site, this page was created specifically to support educators attending the workshop on Web site development. Look here for tools to make Web development easier.

http://www.indiana.edu/~iirg/ARTICLES/articles.html
The Interface Interest and Research Group (IIRG!) at Indiana University has published several presentations on visual design for the World Wide Web. Visit this site for updates to the information in this article.

http://www.indiana.edu/~eric_rec/comatt/websites.html
The ERIC Clearinghouse on Reading, English, and Communication offers a huge page of resources links to Web sites of interest to teachers. Some of them include specific resources applicable to Web development and many of them demonstrate the kind of Web development that teachers and students are doing.

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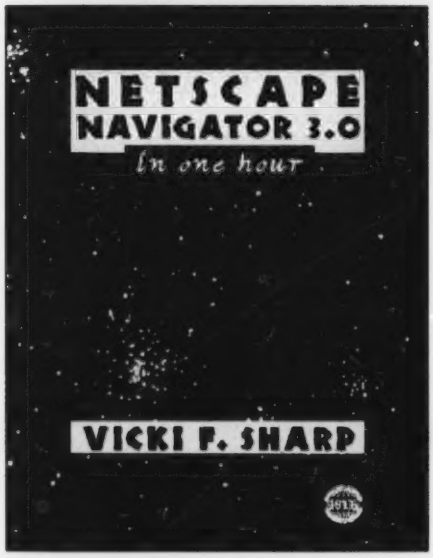
ISTE PUBLICATIONS
ON-RAMP TO THE INFO SUPERHIGHWAY

Click! Quick! Cybertrip!



Netscape Navigator 3.0 In One Hour

Beginners will praise this book's easy, step-by-step approach to using Netscape Navigator 3.0, the most popular Internet browser in use today. Vicki Sharp takes your hand and leads you on a painless trek through cyberspace.

- Download Netscape
- Locate cool new Web sites
- Add Bookmarks
- Use Search Engines to find curriculum material
- Communicate via e-mail and newsgroups

This book also shows you how to collect souvenirs on your journey with free cut-and-paste pictures and Web pages. Includes Netscape shortcuts that will make your trip better, faster, and even more magical.

Vicki F. Sharp
Netscape Navigator 3.0 In One Hour
Macintosh
126 pages, ISBN 1-56484-127-8
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NewsBits

edited by Gleason Sackman

The following Internet sites may prove of interest to many *T.I.E. News* readers.

Computing

The Year 2000 and Two-Digit Dates:

http://www.software.ibm.com/year2000/index.html

This guide for planning and implementation is from IBM.

Catch-Up 1.0:

http://www.manageable.com/

This free service automatically detects whether your shareware, freeware, sound players, system utilities, and browser plug-ins are all current. Catch-Up currently supports more than 500 Windows 3.1, and 95/NT applications.

Browser Tune:

http://www.winmag.com/flanga/browsertune/btstart.htm

This is Windows magazine's browser test and tune-up page. It tests your browser's ability to handle a wide range of standard and legal HTML functions and features.

On Intranets:

Readings and Resources: http://www.iat.unc.edu/guides/irg-34.html

TUCOWS: The Ultimate Collection of Winsock Software:

http://www.tucows.com/

This site offers one of the largest collections of shareware available on the Net for Windows 3.x, Windows 95, and Macintosh.

WebReference.com:

http://www.webreference.com/

This site has everything you need to build or maintain a Web site, from Java Script tips to a downloadable nondithering color palette, all tied together with a multilevel search engine.

Education

New Chalk:

http://www.unc.edu/courses/newchalk/

A biweekly electronic newsletter, New Chalk explores the uses and applications of networked instructional technologies from a faculty perspective.

GeoPedia:

http://www.geopedia.com/

An encyclopedia of the world's nations, GeoPedia offers lots of information about geography, population, culture, modern history, and major industries.

Education World:

http://www.education-world.com/

This searchable database has more than 20,000 education links for teachers, parents, and students. It includes lesson plans, education news, an educators' forum, and more.

Hands-On Activities in Planetary Geology:

http://www.soest.hawaii.edu/SPACEGRANT/class_acts/

This site features 25 hands-on science activities ready for classroom use in teaching geology, earth, and planetary sciences.

Teacher.net Web Site Handbook:

http://teachers.net/manual/

This site reviews Web-authoring software, describes the difference between browsers, touches on graphics formats, points to various HTML instructional guides, and explains how to put your pages onto the Web.

Teacher.net Homepage Maker:

http://teachers.net/sampler/

With this fully automated Web page generator, once you fill out an online form specifying text, bullets, images, and so on, an HTML file automatically generates and e-mails your page to you.

PedagoNet:

http://www.pedagonet.com/

This is a service for exchanging learning materials and resources.

Homework Helper:

http://www.homeworkhelper.com/

This Web site is for students who want a superadvantage for finishing homework and research faster and better.

Ranger Rick:

http://www.nwf.org/nwf/lib/rr/

This is the site for the National Wildlife Federation's environmental magazine, Ranger Rick, which is geared to kids. This site lists current articles and links to full text (and some pictures for those who can see them) of selected articles, both current and archived. A complete index of articles by topic, beginning in 1968, is a special bonus for those who have access to previous editions.

MathDEN:

http://www.actden.com/

The Digital Education Network offers challenging problem sets (at various levels, including advanced) for mathematics students age 12 through 18. If you register for MathDEN (it's free), you can keep a personal progress report to track your cumulative score on questions sets. Twenty new questions are added at each level every two weeks. Try the math challenge every week.

K12-Webdev:

http://www.lr.k12.nj.us/site/lenape/k-12.html

This mailing list is for students and teachers who are establishing their presence on the Web.

The 15 Minute Series:
Tools For The Internet Trainer:

http://rs.internic.net/nic-support/15min

This collection of Internet training materials educates end users in Internet methods and tools.

Government

WWW Virtual Library:
U.S. Government Information Sources:

http://iridium.nttc.edu/gov_res.html

This site, from the National Technology Transfer Center, is a good starting point for U.S. government sites from all branches and agencies. It features more than 900 links.

Bureau Of Land Management:

http://www.blm.gov/education/mesas/mesa.html

A new section of this Web site features information about an important archaeological site in Alaska where the first residents of the Americas lived more than 10,000 years ago.

Science

Science New Online:

http://www.sciencenews.org/

This electronic weekly provides articles about issues in biology, chemistry, physics, astronomy, geology, and mathematics. It uses easy language for a young audience. References for further reading are also provided.

Popular Science Magazine's Best of What's New:

http://www.popsci.com/bown/

This page features the past year's 100 greatest achievements in science and technology.

The Science Hobbyist:

http://www.eskimo.com/~billb/

This site is jam-packed with science demos, experiments, exhibits, articles, resources, museum links, and much more.

Volcano World:

http://volcano.und.nodak.edu/noframe_index.html

This site features just about anything you ever wanted to know about volcanoes.

Searching the Web

Search Page:

http://www.accesscom.com/~ziegler/search.html

This collection of search tools is categorized by type of information.

Search Engine Reviews:

http://www.dis.strath.ac.uk/business/search.html

This extensive collection features articles about searching and search engines.

Clip Art Searcher:

http://www.webplaces.com/search/

This innovative site offers customized search forms that help locate clip art, icons, backgrounds, bullets, lines, buttons, and sounds—just the stuff every World Wide Web page designer wants.

A Webmaster's Guide to Search Engines and Directories:

http://searchenginewatch.com/

This guide provides information on improving a site's ranking by search engines, news on search engines, general indexing tips, and more. Many new pages have been recently added, including tutorials on meta tags, help for search engines in coping with frames, and ways to check on a URL.

Look Smart:

http://www.looksmart.com/

This brainy search engine bills itself as "100,000 flowers, not 60 million weeds." Its menu-driven outline approach helps users narrow their search requests and yield better results. Fewer unwanted URLs are reported, and good descriptions are provided for successful hits. The engine's only real drawback, however, is its need to narrow a search by using extra pages before actually starting; this requires extra patience during busier times.

Education

Trace Research and Development Center:

http://www.trace.wisc.edu/

By accessing the "Designing an Accessible World" page, budding developers can learn to design Web pages for the physically challenged. Today's HTML editors make it easy to produce colorful, graphics-rich pages, but many of them are useless to the physically challenged. This site offers plenty of information on designing pages that everyone can use. Software programs for the disabled (e.g., screen-text magnification, voice-enabled word processing) are also available.

Awesome Web Sites for K-12 Biology Teachers:

http://www2.ncsu.edu/unity/lockers/project/cepwebpt2/mathsci/misc/abws.html

This interactive HyperStudio program provides K-12 science teachers with easy access to curriculum resources on the Web. More than 100 science resources on the Web are briefly described and linked through a point-and-click interface. To view the stacks, however, you must download and view them with HyperStudio Player 3.0 (available at the site, although it requires considerable hard drive space

and download time). The stacks are in Macintosh format but can be converted to run on a PC.

Math Forum Internet News:

http://forum.swarthmore.edu/electronic.newsletter/

If you're having trouble keeping up with math and math education on the Internet, then check out this weekly newsletter site, which also offers an archive of past newsletters, a FAQ site, and subscription directions. Concise weekly postings offer materials for students, teachers, and mathematicians at all levels.

Science Links:

http://www.dorsai.org/~indianal/science.html

This site offers a comprehensive listing of and links to science and math resources for K-12 and college students: archaeology, biology, chemistry, earth sciences, energy, environment, meteorology, natural history, physics, science education, and zoology. The site will always be incomplete and under construction—which is why it will remain a place to visit!

District Copyright Web Publishing Rules:

http://www.bham.wednet.edu/copyrule.htm

If you're concerned about copyright violation while doing Web publishing, then check out the information offered here by the Bellingham (Washington) Public School District. Its "Web Rules," copyright permission form letter, and links to authorities on copyright law will help you and your students avoid legal problems.

K.I.D.S Report:

http://wwwscout.cs.wisc.edu/scout/KIDS/index.html

This bimonthly Internet publication is both for and by K-12 students and is the result of a cooperative venture between two classrooms—one in Madison, Wisconsin, the other in Boulder, Colorado. It includes the students' own links to and discoveries, investigations, and descriptions of important sites. The project is ongoing for the current school year; subscription information is available at the site's main page.

Talk City Educenter:

http://www.talkcity.com/educenter/

This Web site offers weekly moderated open chats and discussion series for educators and is a great place to exchange ideas with colleagues. Be sure to check the calendar for upcoming events.

ORBIT MAGAZINE:

http://www.orbitmag.org/

This "John Q. Impossible" publication offers new concepts in teaching as well as entertainment for students (grades 3-12), parents, and teachers. Published quarterly, the 64-page magazine is free of advertising.

Digital Education Network:

http://www.actden.com/

This site offers a variety of subject areas for exploration— astronomy, current events, graphics, the Interne, math, and writing— for students ages 12 through 18, at various levels, including advanced. Although it's free, users must register to use the site. In the MathDEN, for example, users can keep personal progress reports and tackle a new math challenge every week.

Government

Welcome to American Government

http://wsd.waupaca.k12.wi.us/~crichards/govern.html

This student-produced site is a first-class collection of links to government Web pages.

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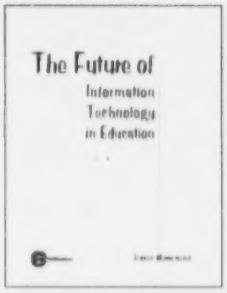
What will education be like? How will education be changed?



- Conclusions and recommendations for school leaders at each stage of the change process.
- General forecasts supported by multiple sources of information and forecasting techniques.
- Six-step strategic planning process.

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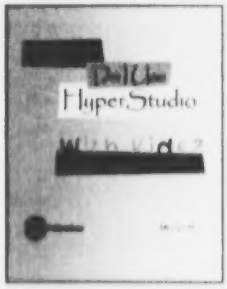

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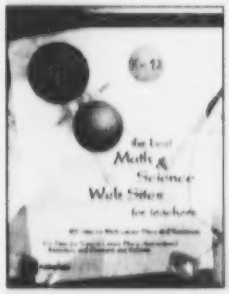

- Get a jump-start on the school day with ready-to-go lesson plans.
- Excite your math students with puzzles, activities, games, and other creative resources.
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- Quickly access specially selected sites that offer appropriate, relevant, and engaging material.

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Book Reviews

Review by Greg Collins

Titles:

New Kids on the Net: A Tutorial for Teachers, Parents and Students (ISBN 0-205-19872-4)
New Kids on the Net: A Network Sampler: Internet Activities for K-12 (ISBN 0-205-19873-2)
Author: Sheryl Burgstahler
Publisher: Allyn & Bacon

In her latest tutorial resource, *News Kids on the Net*, Sheryl Burgstahler provides a blunt yet necessary response to technophobia: "Get over it." In her two books, *New Kids on the Net: A tutorial for Teachers, Parents and Students* and *New Kids on the Net: A Network Sampler—Internet Activities for K-12*, Burgstahler raises a great range of questions and concerns that newcomers to the Internet might have. Her books provide step-by-step tutorials about the Internet that beginners will find most helpful, and experienced "surfers" will find the lessons to be valuable resources for teaching others about the Internet. The main tutorial examines topics such as e-mail, the World Wide Web, and using FTP. The sampler complements those tutorials with hands-on activities that make the learning experience highly valuable. The following are highlights of how Burgstahler's books turn the Internet from an intimidating space to a world in which anyone can become a competent traveler.

All teachers and students should learn the basics of e-mail this year. Its ability to provide rapid, concise communication between people makes for powerful classroom activities, as Burgstahler notes. Her discussion of e-mail details the challenging steps of logging on for the first time, understanding addresses, and sending and reading messages. A brief discussion of online conferences would be beneficial for the countless students who have already and will continue to access systems such as America Online and Compuserve. Burgstahler's tutorials on e-mail will ensure that anyone who reads them will quickly find his or her way through the medium and no doubt become addicted. ;-) Chapter 3 carefully examines listservs and discussion lists that provide powerful forums for classrooms on thousands of topics.

World Wide Web Discussion

The tutorials are good at revealing the dimensions of the entire World Wide Web to the beginning surfer. With a concise overview of how to surf the Internet, all students will be able to search it quickly to find relevant information for their own studies. The book's suggested lessons encourage all classroom teachers to explore the Internet with their classes in an orderly and effective manner. Many of the terms that pose initial challenges (e.g., FTP, gopher, downloads, chat rooms, Usenet) are carefully defined and explained. The guide not only has a glossary of terms, but also provides the reader with a reference chapter of interesting and useful sites to visit. Chapters 5 to 7 even deal with the often-neglected world of gopher and Telnet to provide the newcomer with powerful tools for finding resources and then downloading them to one's own computer for personal use. Overall, Burgstahler's exploration of all the nooks and crannies of the World Wide Web will prove educational and enjoyable to all users.

No Tutorial on Web Page Creation :-(

The only disappointment in Burgstahler's work is her omission of a tutorial on designing Web pages in Hypertext Markup Language (HTML). Students will find the Internet fascinating but will certainly ask the inevitable once they have been on a few times: How can I make my own Web page on the Internet? Although HTML provides enough material for a book in and of itself, a small chapter devoted to the most basic HTML codes needed to design the most basic Web page would have been useful. In Chapter 9, Burgstahler does provide several URL links to HTML guides, but my concern is that those links will be unnoticed by the beginner among so many other impressive links. Chapter 9 also provides a number of other Internet links on the topics covered in her book. As a teacher, I would have

liked to have seen a section devoted to educational sites (K-12) or even lesson plan sites. Burgstahler's sites will get you to such information eventually, but the newcomer to the Internet needs a clear and explicit road map to find the Internet's rich resources. Teachers, especially, could benefit from such a map.

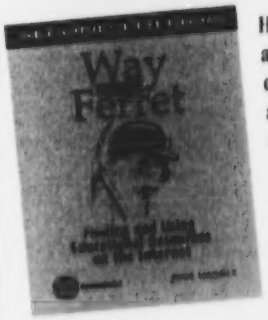
News Kids on the Net: A Tutorial for Teachers, Parents and Students ISBN: 0-205-19872-4 and *New Kids on the Net: A Network Sampler: Internet Activities for K-12* ISBN: 0-205-19873-2 are available from Allyn & Bacon Publishers.

Greg Collins is a graduate of the Faculty of Education at York University. He begins his teaching career in the fall of 1997 as a teacher and librarian with the North York Board of Education in Ontario; Greg_Collins@edu.yorku.ca; http://www.edu.yorku.ca/ ~ tcs/ ~ gcollins/home.html.

ISTE PUBLICATIONS

RESOURCE TOOL FOR THE INTERNET

CyberFrontier



Hit the trail with Judi Harris' fabled ferret as she unearths Web sites, original source documents, free and inexpensive software, and even more on the educational frontiers of the Internet.

Cyberspace is bigger and better, and so is the *Way of the Ferret*! Fresh, new chapters in the second edition of *Way of the Ferret* will expand your...

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- World Wide Web browsers
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- Newsgroups
- Directories

...**imagination** in designing dynamic curriculum-based activities for your students, choosing from 18 effective activity structures.

...**organizational abilities** in revolutionizing your students' educational experiences with telecollaborative and teleresearch activities.

Extending the common-sense approach of her "Mining the Internet" column in *Learning & Leading With Technology*, Judi Harris uses her experience with students and educators along with skillful, humorous analogies to explore the boundaries of the cyberfrontier.

Judi Harris
Way of the Ferret, Second Edition
293 pages, ISBN 1-56484-085-9
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Submission of Manuscripts

T.I.E. News (soon to be *Journal of Online Learning*) is published quarterly by the International Society for Technology in Education Special Interest Group for Telecommunications. The journal solicits articles on various aspects of K-12 and college instructional use of telecommunication, with emphasis on computer-mediated communication.

Manuscripts should be sent via e-mail as file attachments (Word or WordPerfect preferred). ASCII text in e-mail messages will also be accepted if attachments are not possible. Submissions sent ny land mail should be sent on 3.5" Macintosh or DOS/Windows diskette.

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North York, ON M3J 1P3
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Call for Articles

Open Call

Contributors are welcome to submit articles to *Journal of Online Learning* on any topic related to telecommunications in education. Because the journal is a reflection of field-based activity that embraces novice and expert alike, we accept a wide range of material, from anecdotal reports of current projects to scholarly research.

Theme Issues

Journal of Online Learning will post calls for articles on particular themes in this space each issue.

For more information on submitting to the journal, please refer to "Submission of Manuscripts" in the first column on this page.

GREAT STUDENT PROJECTS
Deadline: November 15 (revised)

Here's a call for online educators who have created, participated in, or marvelled at the impact that student projects have had on learning. Descriptions of projects created by teachers (or other adults) are welcome, of course, as are projects actually created or operated by students. Accordingly, *T.I.E./JOL* invites contributors to encourage actively the participation of students in papers prepared for this call. Coauthored submissions are also welcome.

A DOCTOR IN THE HOUSE
Deadline: November 15

One area that many online educators have been learning about is the impact of our work on our own and our students' health. Sometimes online programs link constituencies in care facilities with others who share experience or interest in common concerns. Sometimes we are affected physically or emotionally ourselves by our own engagement in the work we do online. In this call, *T.I.E./JOL* invites articles about how our work affects our health, and what people have learned about dealing with these issues. Our readers are encouraged to invite submissions from our colleagues in the health sector. Of course, coauthored submissions are also welcome.

REFLECTIVE COMMUNITIES AND TEACHER EDUCATION—A Series

Associate Editor Opportunity: This series seeks an Associate Editor.

Deadline: February 1

This call seeks to develop a series of articles on the use of communications technologies in teacher education. What is the impact of professional discussion on practice when it is undertaken in the written environments of asynchronous environments (e.g., computer conferencing), synchronous environments (e.g., MUDs/MOOs), or face-to-face communities that may emerge from within online contexts? How has Web construction built collaborative communities online and face-to-face?

Both preservice and inservice will be featured in this series.

GRADUATE STUDENT RESEARCH — A SERIES ON THEORY AND PRACTICE

Associate Editor Opportunity: This series seeks an Associate Editor.

Deadlines:
August 15
November 15
February 1
April 1

T.I.E. News/Journal of Online Learning wants to hear from graduate students who are undertaking research in educational telecommunications. Manuscripts should be between 1,500 and 2,500 words.

In this series, *T.I.E./JOL* is especially interested in publishing articles that clearly reveal the relationship between theory and practice. Coauthored submissions (e.g., with supervisors, group submissions from graduate courses, etc.) are welcome.

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